INTERNATIONAL ABSTRACT OF SURGERY

APRIL, 1919

COLLECTIVE REVIEW

PRIMARY SUTURE OF WAR WOUNDS

By ROGER T. VAUGHAN, M.D., F.A.C.S., Chicago

THE development of a technique for the successful treatment of open wounds by excision followed by primary suture has been one of the great surgical accomplishments of the present war. This technique is bound to be carried over into civilian emergency surgery by our returning army surgeons and will greatly benefit those patients receiving open injuries in industrial accidents, railway collisions, and the like.

These advances are the culmination of a relatively rapid process of evolution in wound treatment, surgical progress keeping step with the stages of the war. Our grasp of the fundamental principles underlying primary suture will be more secure if we follow the series of steps which have led up to the present practice and understand the reasons for abandoning earlier procedures for the later.

Primary suture of wounds as now practiced stands in seeming contradiction to certain surgical ideas commonly accepted before the war. Previous to 1914 it was generally conceived that a wound already actively contaminated could not by any technique be closed as though aseptic. This result is now, however, easily accomplished and yet there is no original element in the method. It is merely the successful combination of a number of altogether logical surgical procedures already known for a long time. Only the combination is new.

Axhausen of Berlin proposed the excision and primary suture of open contaminated wounds as early as 1910; but his article at that time aroused little notice. In 1915 after having used the method extensively in army service, he published his results. The method then received the attention in the central empires which it deserved and since then has been extensively used by German and Austrian surgeons.

Among English surgeons H. M. W. Gray was one of the first to consider the feasibility of primary suture in war wounds, and his experimental work and publications were influential in winning over English military surgeons to primary suture. To the French surgeons, however, belongs the credit of having most generally adopted and popularized primary suture at a relatively early date during the war, and French publications have been of the greatest value in disseminating information concerning the value and the technique of this method of wound management.

PERIOD OF EXPECTANT TREATMENT

When the war broke out, army surgeons labored generally under the impression that war missiles were relatively harmless so far as bacterial infection was concerned. In the summer of 1914 particularly during the period of open fighting, surgeons were generally content to disinfect the wound of entrance with tincture of iodine, remove visible foreign bodies, and apply an aseptic dressing. Such cases as were operated upon were either vascular injuries, extensive wounds necessitating limb amputation, penetrating wounds of the skull or abdomen, or infected wounds arriving at the base with fully developed suppuration. Other cases after dressing were placed under observation. During the period of open fighting these methods were probably as successful as

during the Balkan wars; but with the setting in of trench warfare after the Battle of the Marne the results obtained by this practice became strikingly unfavorable. In the majority of cases fever set in after twenty-four to forty-eight hours, pain became progressively more and more severe, and active and violent suppuration started in the wound, with abundant foul discharge and marked inflammatory reaction. Active surgical measures became urgently necessary. In spite of incisions, pus would continue to appear in neighboring intermuscular spaces and new and numerous incisions had to be made. The general condition of such patients declined rapidly. Gas gangrene, secondary hæmorrhage, and persistent suppuration were very frequent. Deaths from septicæmia were numerous and patients who ultimately recovered remained on the sick list for a long time, could not be transported, and very frequently were permanently invalided or crippled. This surgical period lasted up to about the middle of November, 1914.

PERIOD OF INCISION AND DRAINAGE

In consequence of the above observations, army surgeons came to consider all wounds primarily infected, even when seen before clinical evidence of inflammation had developed. Accordingly it became the practice for all patients to be operated upon immediately upon entrance to the hospital, without waiting for symptoms of inflammation to develop. Wounds were widely incised, and foreign bodies, such as projectiles, clothing and the like, removed. The wound was dressed with sterile gauze and immobilized. This period covers the end of 1914. It marked a great improvement over the expectant method. But all wounds exhibited a stage of suppuration, and some elimination of muscle, fascia and bone splinters by sloughing. Fever, even in favorable cases, usually lasted a fortnight. Dressings had to be changed two or three times a week, sterile gauze being used, usually without irrigation.

PERIOD OF WOUND TRIMMING AND EXCISION (DEBRIDEMENT)

The next step in improvement was to remove all avascular tissue at the time of the initial incision and all those structures evidently dead or destined to die. Foreign bodies were extracted as previously. The operation during this period consisted in following the track of the projectile through the tissues, removing injured skin, connective tissue, fat and fascia, muscle and bone fragments, i.e., all that experience had taught was doomed to slough and cause continued suppuration. The operation was then ended by dressing the wound with sterile gauze. Slight fever usually followed in these cases, from 99 to 101 degrees; but it lasted only four or five days, as a rule, and most wounds rapidly became pink and healthy looking and healed normally by granulation. This method was practiced by a number of surgeons early in 1915.

PERIOD OF FIXATION WITH IODINE

It gradually came to be understood that in excising the contaminated portions of the wound, the clean portions exposed received a surface inoculation. Accordingly the practice was taken up in many hospitals of trying to fixate these surface bacteria with tincture of iodine just as they are fixed with iodine in sterilization of the skin by the Grossich method. The wound must first be completely dried with gauze (some surgeons also recommend the hot air blast following complete hæmostasis) before applying iodine.

The iodine period may be said to have begun rather early in 1915, although, to be sure, some surgeons used iodine in this way still earlier in the war and some in civilian practice even before the publication of Grossich.

CARREL METHOD

Before the middle of 1915 Carrel's first technique was published. It was tried by many surgeons, some with indifferent and some with very good results, while others found, as did Lemaitre, that it brought back the evil days of 1914. We shall not here go into the reasons for the success of the method in some hands and the failure in others, but will simply pause to note that Carrel in his latest publication (*The Treatment of Infected Wounds*, 1917) recommends primary excision (p. 61, 95) as the method of choice whenever the patient reaches the surgeon at a sufficiently early date, usually not more than eight to ten hours after the receipt of the wound; but he neglects to state when he uses primary suture, if at all, though he does use delayed primary or early secondary suture in 90 per cent of cases (p. 185, 186).

PERIOD OF PRIMARY SUTURE

By the middle of 1915, a number of surgeons were already practicing what practically amounted to primary suture as now understood. Some of them had tried antiseptics and had given them up, and others had gradually evolved a method of primary suture in the course of their operative experience. H. M. W. Gray published his experimental and clinical results about this time. Axhausen in Germany, Bárány and Ranzi in

Austria published the results of their experience; and in France Lemaitre, Tissier, Duval, Depage and others popularized the method. Primary excision gradually became a more extensive operation. The entire exposed surface of the wound came to be excised, including skin, fat, fascia, muscle, and bone fragments, only nerves and large blood-vessels being left untrimmed. Not only does primary excision control the development of suppuration, but it is also of the greatest importance in preventing the development of tetanus, as brought out by Sir David Bruce in the preliminary report of the British Tetanus Commission at Paris in October, 1918, at the meeting of the Red Cross Research Society.

Primary suture was tried, first in freshly excised wounds appearing relatively clean, and then was practiced with increasing frequency as the results obtained became continually more favorable, due to increasing experience and skill with the method. The slow healing by granulation and the extensive scars formerly seen were thus done away with to a large extent. In those patients deemed not suitable for immediate suture and who remained under the surgeon's observation sufficiently long, delayed primary suture was often performed two or three or even four days after the primary excision, provided that the wound was seen to be clean and relatively free from micro-organisms by the smear test. Where laboratory facilities were lacking, clinical appearances alone had to act as a guide to delayed suture; but success was not so uniform as where bacteriologic aids were in use.

In the early days of the war no cases did worse than those primarily sutured, as Bowlby aptly reminds us, and the recollection of these cases was one reason why some surgeons were slow to give up secondary closure and why others adhered to, or still cling to, the Carrel method. Primary closure was first used extensively on wounds of the knee-joint, following the observation that those wounds left alone or closed after preliminary cleansing terminated more successfully, as a rule, and with less suppuration than those cases in which through-and-through drainage was inserted. Bárány and other Austrians practiced primary excision and closure upon wounds of the scalp and brain, after observing that secondary closure nearly always resulted in encephalitis, meningitis, or brain abscess. Early in 1916 wounds of the lung and the abdominal wall were primarily closed with success by some surgeons.

The chief difficulty in carrying out primary closure of wounds of the extremities lay in the large masses of devitalized muscle to be dealt with, which became readily infected if not completely removed; and always there was, too, the impossibility of excising large vessels and nerves lying in the contaminated depths of the wound without sacrificing the entire limb. Wounds with extensive fracture and comminution were difficult to excise and cleanse completely and often resulted in great shortening of the limb when so managed.

The year 1917 saw increasing adoption of primary suture in favorable cases. It was especially favored in joint and cranial injuries and uncomplicated wounds. With the entry of America into the war many of our army and Red Cross surgeons took up primary and delayed primary suture with great success, but others, unfortunately, showed more enthusiasm than good judgment, so that an S. G. O. order had to be issued last summer (1918) against certain applications of primary suture. Our army surgeons are still divided in opinion over the relative value of the different methods of wound management.

In practicing primary excision and suture we can stop with the first operation or at any stage of the procedure and take up the successive steps later as opportunity presents. By thus permitting interruptions and postponements this method is particularly adapted to war work where evacuation of the wounded from station to station is repeatedly practiced from military necessity. The initial dressing can be placed at the first aid station, primary excision practiced in the advanced operating station or even in a well equipped field hospital, and the wound dressed. Closure can subsequently be completed at the base one, two, three or four days later, or secondary suture be performed still later, with or without Carrel treatment, depending on the surgeon's preference and whether suppuration develops in the wound in the meantime.

TECHNIQUE

The steps of the technique as commonly performed are as follows:

1. Incision. This is usually made either parallel to the direction of the muscle fibers or to the direction of the large vessels and nerves; or it may be differently placed so as to open up the track of the projectile widely; or it may actually connect the wound of entrance with the wound of exit.

2. The track of the projectile is followed, all diverticula opened, and explored.

3. Foreign bodies, clothing, projectiles, and loose fragments of bone or skin are removed, to-

gether with all tissues already dead or avascular and destined to necrosis. Important vessels and nerves must be saved; otherwise primary amputation might as well be performed.

4. Hæmostasis is completed with ligation of all visible bleeding points, followed by gauze pack for a few minutes and then by fixation of the bacteria in the wound by tincture of iodine.

5. Repair of the structures is made by suture.

It is exceptional that one is not able to carry through these different steps up to No. 4 inclusive at one time. If, however, because of the patient's poor general condition or other material circumstances of the moment, excision of the damaged tissues is not completed, one must effect their removal at a subsequent dressing to avoid spontaneous elimination by necrosis and consequent contamination of the wound.

When all steps of the operation except suturing have been completed, bacteriologic examination by smear and culture is in order; then, if the clinical appearance of the wound indicates the advisability of its suture, it is closed; if not, it is dressed and left to await the result of the bacteriologic examination and clinical developments. If the wound is closed primarily, the bacteriologic findings will indicate whether it should be opened on the ensuing day or may remain closed. Halstead is strongly opposed to closing any war wound without bacteriologic examination, so great is the danger from streptococcus infection.

The first and chief objective of the surgeon is to prevent infection of the wound. Excision removes the primary contamination, and suture prevents secondary infection from the skin or dressings. The mechanical repair of the wound is a less important consideration.

NECESSARY CONDITIONS

Primary suture can be practiced only when proper surgical surroundings make aseptic conditions possible. There must be an efficient and experienced surgical organization, familiar with the procedures undertaken and accustomed to working together.

Operating-room facilities must be such as to assure thorough asepsis. Lighting facilities should be so provided that as the field of operation is extended, the track of injury is clearly seen step by step and foreign bodies and dead tissues readily recognized and removed. An electric light strapped to the surgeon's forehead is a help. Sterile rubber gloves are indispensable and, if available, fresh pairs should be in reserve for needed changing. The surgeon's gloved hands should not come in contact with the wound if possible. A strict Lane technique should be followed. Colonies of germs are starting to develop on the surface of the fresh wound and the uncontaminated portions of this surface must not become infected from them. Instruments which have been used once had better be set aside and resterilized and fresh ones made available, although Axhausen considers this refinement not necessary and Lemaitre thinks that wiping off smooth instruments with sterile gauze is perhaps sufficient. No one denies that a plentiful supply of instruments and a well equipped operating room are desirable.

Assistants must be trained to the work. Their retractors and hands must not be used to spread contamination. Sponges must remove blood only by pressure on the wound and not by rubbing. The latter spreads contamination besides smearing and obliterating the track of the projectile which it is desired to follow. They must know and carry on the Lane technique and be on the lookout for foreign bodies or necrotic tissues overlooked by the operator.

Facilities must be present for general anæsthesia. A trained anæsthetist will relieve the surgeon of distracting responsibility at a critical time. Local anæsthesia is sometimes practicable and even desirable in superficial wounds as recommended by Brock and others; but since its tendency is to decrease the resistance to infection of tissues already contaminated, it must be used with marked discretion. Halstead used local anæsthesia for most of his delayed and secondary closures. Spinal anæsthesia has also been used under war conditions when general anæsthesia was either not available or undesirable.

An accurate knowledge of the topographic anatomy of the region operated upon is essential. A surgical atlas at hand for reference is sometimes desirable. The surgeon must bear in mind the varying positions of muscles, nerves, and arteries in various positions and movements of the limb. A straight path made by a projectile in a flexed limb will no longer be straight when the leg lies flat on the operating table but will penetrate the different muscles at different levels. The surgeon must also bear in mind the innervation and blood-supply of the muscles and skin of the region; for if in excising the wound he severs the blood or nerve supply to the distal parts, further necrosis may occur and another excision or even amputation become necessary. Finally, the surgeon must be so thoroughly impressed with the necessity of securing a clean wound by thorough removal of all contaminated tissues that he will have the courage to follow the procedure to completion.

We shall next consider in more detail the steps in primary excision and suture.

EXAMINATION OF THE PATIENT BEFORE OPERATION

1. *Roentgenography.* The use of the X-ray either by plates or, more usually, the fluoroscope is desirable if not always absolutely essential for the successful removal of foreign bodies. The army localization of foreign bodies has reached a high degree of development and is practically always used in U. S. units when available. The experienced surgeon can follow up the track of the projectile quite successfully in many cases without fluoroscopic aid. But in cases where two projectiles enter through one opening or where the missile breaks up after entering the body and makes a Y-shaped track, the X-ray is indispensable. Furthermore, it often warns the surgeon in advance as to difficulties he will encounter in following the track at operation. In some cases it reveals the presence of a wound or fracture which clinical examination was not certain of or had missed entirely. In the case of simple penetrating wounds, however, where it is relatively easy for the surgeon to follow the track, the X-ray examination is sometimes omitted in French practice (though not in the U. S. service) to save time. This omission cannot be recommended in civilian practice.

In the case of multiple wounds such as hand grenades, buckshot, glass splinters and the like, a special fluoroscopic operating table is necessary equipment if all foreign fragments are to be removed within a reasonable space of operating time. Unfortunately fluoroscopic tables are not available in many hospitals, army or otherwise.

2. *Clinical examination of the patient.* One contra-indication to primary suture, and even to radical wound excision, is an unfavorable general condition of the patient. It is useless to suture wounds in patients so debilitated that primary healing is out of the question because of the general lowering of tissue vitality. The pulse must be examined as to rate and volume. It is a better guide to the patient's general condition than the temperature, though the latter too has much prognostic value. Lemaitre never sutures primarily a patient with a pulse above 120. Blood-pressure is another valuable guide. A patient with a systolic pressure under 90 is a dubious case for excision and suture; and a systolic pressure under 70 and diastolic under 55 indicates too much shock for immediate operation.

Patients should receive a general examination as to the presence of other wounds. These latter may usually be ignored if superficial; but when they have led to much hæmorrhage, pulse and blood-pressure should be reasonably close to normal before operation. Hæmoglobin estimation and white count are of less prognostic value and, as a rule, time is scarcely available for them.

A factor of great importance is the time elapsing between injury and operation. The Interallied Surgical Commission in its report states that primary suture should not be performed when more than eight hours have elapsed since the injury. This is not, however, a hard and fast rule because army surgeons not infrequently have successfully sutured wounds after twelve hours, and in some cases, even up to twenty-four hours. The individual case requires judgment on the surgeon's part; but there is no disputing the fact that the less the time elapsed, the greater the prospect of primary healing.

EXAMINATION OF THE WOUND

1. Since infection is the surgeon's principal enemy, his first thought will be to recognize its presence in the wound and its character. Some surgeons use smears, some cultures; but clinical evidence is also important. The presence of gas in the tissues around the wound must be looked for with special care. It will be recognized by the crackling on palpation, by tympany on finger percussion, or by filiping the skin with nail percussion. The points which are painful to percussion in the neighborhood of the wound must be examined most closely for evidence of gas. The fluoroscope or X-ray plates may reveal gas in the tissues. It may show very distinctly in the plates, infiltrating along the muscle planes and underneath the skin. Once seen in the X-ray, it can also be shown clinically. Such wounds must not be sutured primarily; but after primary excision and special care to remove all dead muscle, they must be left wide open with a light gauze dressing and, in favorable cases, may subsequently permit of secondary suture.

2. Nerve and vessel lesions must be looked for. Motor or sensory paralysis must be noted, if present, since it helps indicate the course of the projectile and warns the surgeon in advance of certain repairs to be made. Injury to or division of main nerve-trunks occasionally is a contra-indication to primary suture, particularly in the case of wounds lying below the level of the division.

Vascular lesions are easily overlooked if hæmorrhage has already stopped. It is important to recognize them, because flaps with a poor vascular supply are not proper subjects for primary suture, and subsequent hæmatoma formation would en-

danger clean healing. Where there exist two or more wounds in an extremity, with the main blood supply cut in the proximal wound, the distal wound should certainly not be primarily sutured.

3. Hæmatomata found in the fat, fascia, or muscle should be accurately excised since they form a fertile field for necrosis and sloughing. Gas gangrene, the greatest peril in primary suture of war wounds, has a marked predilection for a necrotic or poorly nourished muscle. When the hæmatoma infiltrates a large part of the wound or of the limb so that excision is difficult or incomplete, suture should not be attempted. The hæmatoma is split widely, all clots are removed or clipped away, with all blood-soaked tissue that can be spared, and the wound dressed with gauze, avoiding any compression.

4. Many extensive injuries of the extremity, it will be self-evident to the surgeon, are unsuitable for primary suture. Particularly is this the case with fractures and bone injuries where cleansing and excision of the wound are difficult. It is usually better for the average surgeon to practice delayed primary suture in most compound fracture cases and not to attempt primary suture until thoroughly familiar and successful with their management by delayed primary closure. Halstead is strongly opposed to the primary suture of compound fractures. Blake also sounds a warning note to the inexperienced to try delayed primary suture rather than immediate closure.

5. In multiple injuries the initial problem is diagnostic rather than operative. Will the patient's general condition and vitality see him safely over the operation and carry him through to a subsequent recovery? This is often a difficult question to decide and calls for great experience and common sense.

THE OPERATION

1. *Preparation.* Blake recommends dry shaving of the part, cleansing of the skin with ether, followed by a 3 to 5 per cent solution of iodine and alcohol. The use of a rubber constrictor will depend upon the nature and location of the wound and the condition of the limb. It must be recalled that prolonged constriction tends to favor the development of gas gangrene and anaerobic infection.

The anæsthetic as a rule is ether. Gas-oxygen will no doubt be used to a considerable extent in civilian hospitals. In small and superficial wounds novocaine local anæsthesia may be used, as recommended by Brock; but for larger wounds it probably increases the danger of infection and saves no time.

2. *Incision.* Before cutting down on the track of the projectile the limb should be put, when practicable, in approximately the position it was in at the time the wound was received, in order that the perforations through the various tissues and muscles may be as continuous and contiguous as possible. The edges of the skin wound are excised, together with the subcutaneous connective tissue, fat, and fascia down to the muscle. As a rule not more than 1 cm. of skin need be removed on a side. One must bear in mind that the skin edges must ultimately come together, and in order to accomplish this end successfully, economy of tissue removal is a necessary virtue.

The path of the projectile must be followed through the muscles and intermuscular spaces. Muscle as well as fat and fascia must be excised wherever dead or soiled. The incision in the skin will be extended in whichever direction necessary to allow of free access to the path of injury. In performing the excision from the skin down through the muscles, the surgeon must bear in mind that he is operating in an infected area and that his instruments may carry germs from the infected surface of the wound to the freshly cut clean surface. Consequently, the safest practice is to discard every soiled instrument, as recommended by Moynihan, making each fresh incision into clean territory with a clean blade and using a strict Lane technique, handling the wound surface and edges only with instruments and not with the gloved fingers.

This strict technique demands an ample armamentarium. Most army surgeons have had to be satisfied with a less strict technique. Lemaitre recommends changing instruments frequently but states that he is often satisfied merely to wipe off smooth instruments with sterile gauze. Axhausen, at the other extreme, does not resterilize his instruments or hands during the same case, or advise doing so. Halstead says that in times of great press of work during the drives last year, he and other surgeons under his command have gone from fresh case to case, simply rinsing their gloved hands in water and bichloride and reboiling instruments from time to time, and yet secured about as high a percentage of primary healing as under more leisurely conditions. Surgical judgment, experience and speed, avoiding mauling of the tissues, are no doubt great factors for success in this kind of work.

All muscle which does not bleed or which has lost its normal color, or which does not react by fibrillary twitchings when pinched with a forceps,

should be excised. Every part of the wall should bleed, says Moynihan, when excision is complete. Small bleeders revealed in the process of excision should be ligated, and the absolute prevention of subsequent hæmatoma formation by careful hæmostasis is very essential to the prevention of infection. Foreign bodies and fragments of clothing should be looked for and removed. It must be remembered that the neighborhood of the wound of entrance and the outer portion of the track through the fat, fascia, and muscle is the region where foreign bodies and contamination are most frequently located.

In cleaning away soiled or necrotic tissues, some surgeons prefer curved scissors and others the scalpel. The main thing, however, is the excision rather than the tool used. All dubious tissue must be removed, the track and its diverticula laid bare and the penetrating wound either transformed into a gutter wound if superficial, or completed through and through, sufficiently enlarging it to inspect every corner and boundary and to stop all the bleeding.

Penetrating wounds may also be attacked from both ends, first from the side of entrance, and then from the side of exit, as engineers build a tunnel. Such a method may help the surgeon to stick to the track of the missile or regain it when lost. Following the track is sometimes simple, but not always so. It is easy to lose one's way and produce artefacts resembling the track. Little blood-clots along the pathway, adherent fragments of clothing, or simple ecchymotic spots in the muscle may help to pick up the course when lost. Sometimes shifting the position of two adjacent muscles will cause a broken path to become continuous, and, when the path is completely lost on one side, it may be taken up again from the opposite side, or even from a fresh incision. In some instances the use of a coloring agent may help to follow the track. Le Grand uses 5 per cent methylene blue in 20 per cent formol. Wilson, Hey, and Moynihan use brilliant green. Acriflavine is another popular dye with the French. Cross, Carrel, Blake and most American surgeons do not favor dyes.

In oblique wounds one may sometimes best follow up the track by a series of "ladder incisions" instead of a single long incision. When the limit of one incision is reached, a gauze strip is introduced into the path and this gauze cut down on by another incision at higher level.

When the whole track is opened up and excised, it may be wiped out with a sterile piece of gauze pulled through by a forceps. Such a strip of gauze occasionally may catch foreign bodies or clots or tissue fragments not otherwise located. Against such a rubbing procedure is the fact that it tends to disseminate any germs still present on the wound surface along its track. It is sometimes a satisfaction to remember in deep wounds difficult of access that the contamination present is likely to be less, the deeper one proceeds along the track.

3. *Inspection of the track and excision.* When the wound track has been followed through completely, it is re-inspected for foreign bodies and bone splinters and these removed if found. The nerve, vessel, and bone lesions are next subject to inspection.

Nerve injuries when found will be immediately treated. Complete division will be repaired by suture and partial division by a stitch bringing together the neurilemma. Nerves should not be excised in excising the wound. Occasionally a small hæmatoma in one nerve end may be trimmed off when no undue shortening is thus caused; and a complete crushed nerve of course cannot be saved. The unnecessary sacrifice of nerve continuity as well as the unnecessary excision of clean penetrating wounds were two of the serious errors most commonly made by civilian surgeons when starting in to treat war wounds. Some surgeons enclose the repaired nerve in muscle or fascia or other protective tissue, while some, like Lemaitre, do not do so unless there is a special indication such as the proximity of a fracture.

In the majority of cases of arterial injury, double ligature of the vessel will be necessary. The proximal stump may have a second ligature about one centimeter above the first when possible, as long ago recommended by Nicholas Senn. It is seldom that the injured vessel can be sutured except in the case of small lateral wounds in a vessel lying in clean, healthy tissue. Secondary hæmorrhage, hæmatomata, and aneurism formation are the penalties of a failure of judgment in this direction. In case arterial lesions are uncovered in following down the wound track, a tourniquet should be at hand to stop a hæmorrhage impossible to catch immediately with an artery forceps. If the arterial injury is recognized before operation, it may be possible to begin the operation by cutting directly down upon the artery and tying it through this fresh incision which is then sutured primarily. In the case of a large venous trunk, the problem is simpler since, if the bleeder is not caught at once, the hæmorrhage can be stopped by compression.

It is necessary to remove all bone splinters met. In an incomplete fracture the bone wound may

simply be freshened with a rongeur forceps. In removing splinters the periosteum and cortical osteogenetic layer are preserved, as emphasized by Leriche and Blake. The latter recommends highly Ollier's periosteum cutter for this purpose. The bone marrow is inspected and its superficial surface removed if soiled or hæmorrhagic.

Joint lesions may be treated by exploration and cleansing or by a classical excision or, in certain cases, by expectant treatment; but should not be drained through-and-through. The treatment of joint lesions is a chapter in itself and cannot be gone into here in detail.

In inspecting the outer portion of the wound track, the deep fascia needs special attention. Generally it is simply perforated, but sometimes also fringed with shredded necrotic fibers. These shreds must be excised and then the spot must be examined with particular care since it is about here that one often finds minute fragments of clothing adhering to the tissues and preparing the way for infection. Intramuscular fascia needs the same attention; and if a few adjoining muscle fibers are removed, the danger of leaving behind adherent shreds of clothing will be lessened. The dense fascias are turned and inspected both above and below.

Tendons in the path of the projectile must be likewise minutely inspected and, if cut, sutured after freshening of the ends. If too much is destroyed for reunion to be possible, the stump may be sutured to a neighboring tendon. Catgut sutures are likely to make less trouble subsequently in this work than unabsorbable sutures. When tendons are merely grazed and soiled but not cut, they must be cleansed minutely, nevertheless, or even dissected away from the soiled or crushed surrounding tissues.

When the subcutaneous or intramuscular spaces are infiltrated with dark blood or with blood which has been transformed into a pinkish or greenish gelatinous mass, complete excision should be performed. This clot change is often a prelude to severe inflammation and denotes the danger, if not the actual existence, of a beginning gas phlegmon.

The muscles themselves may be extensively destroyed by the explosive action of a high-speed bullet. Muscle necrosis may be widespread throughout an entire muscle belly or a small group of muscles. This destruction *en masse* is an exceedingly grave injury since complete excision is necessary, and the condition difficult often of recognition, and still more difficult of attainment. Dead muscle is one of the best culture media for the gas bacillus; and when it sloughs and is infected with pyogenic organisms, it is apt to transmit the suppuration at an early date far up into the interior of the limb. K. Taylor considers from experimental evidence that dead muscle is more dangerous in a wound than cloth. The extent of muscle excision necessary needs sound judgment and experience for its determination. The beginner is apt to remove either too much or too little; and serious results will be the consequence of an error in either direction. If in doubt, primary suture should not be performed. There are some cases when almost no muscle excision is necessary; there are others where it is necessary in only a part of the track, while in other cases whole muscles or muscle groups must be removed at once.

Normal coloration of the muscle, bleeding when cut, and fibrillary contraction when pinched with forceps are three valuable signs to indicate a living muscle. It should be remembered that fibrillation on pinching will not be present in a muscle deprived of its nerve supply. Traumatizing the free surface of the muscle should be avoided, for such a traumatized surface may not react to pinching, while the intact muscle a little higher up will. A muscle track which presents a normal color needs careful inspection but only a little clipping. When the track is black or grayish, the entire discolored surface of the track must be removed. The excised tissue is sometimes a little more, sometimes a little less, than a half centimeter in width on the average. If there is gas present, more tissue must be removed.

Muscles which are pale and anæmic from compression, which bleed little if any, save from an occasional artery, and which show only slight fibrillary contraction on pinching, may recover if the perimysium is cut and the swollen muscle allowed freely to expand. If after such decompression, however, this muscle does not promptly regain its vitality, it must be excised progressively until a healthier area is reached. A muscle darkened with hæmorrhagic infiltration must be excised too.

It is better to cut muscle longitudinally than transversely. Unless transversely cut muscle bellies are approximated, they cannot regain function. A muscle divided longitudinally will retain its function at least in part, and regain more later by hypertrophy. Transverse excision destroys both blood and nerve supply to the distal portion of the muscle, whereas longitudinal incision may preserve both. A muscle stump deprived of either nerve or blood supply cannot be expected to vigorously resist infection. Simple

perforating wounds of the calf muscles, for instance, frequently heal kindly; but when the track is incised widely and transverse division of the soleus performed, very grave results may follow, owing to the consequent loss of blood and nerve supply. Unless a muscle receives its nerve and blood supply from two or more sources, it is usually better to work around it in following up the path of a projectile, than to cut it transversely.

4. *Hæmostasis and iodine fixation.* Primary suture will not be a success if a hæmatoma is allowed to form. Hæmostasis therefore must be minute, every little bleeder being caught and tied and the whole surface dried by gauze pressure before applying tincture of iodine (3 to 5 per cent). When the iodine fixation is properly done, the whole wound surface becomes as dry as if varnished and assumes a characteristic copper color.

Tincture of iodine fixes not only the bacteria but also the superficial tissue-cells. As a result a slight secretion of turbid serum takes place in the first few days and oozes out between the stitches of the wound or along the capillary drainage. This slight discharge is no drawback if it is properly taken up by dressings, though it delays cicatrization a few days and makes advisable a little later removal of the stitches than in the average clean surgical incision. If primary suture is not performed, the fixative use of iodine improves the early prospects of a delayed primary suture. A number of substitutes have been proposed and used for iodine, when followed by delayed primary suture; among the better known being Haycraft's soap solution, Morison's "bipp," chloramine-T paste, acriflavine paste, and eusol, as well as Dakin's solution and Wright's salt pack.

5. *Suturing.* The varieties of suture have already been mentioned by name. We will here recapitulate them.

Primary suture is the immediate suture of the wound following excision and fixation, as has just been described.

Delayed primary suture is the closure of the wound from one to four days after the excision, without tissue re-excision of any kind. The anatomic layers of the wound may be brought together separately or all together, or the skin alone may be sutured, according to the need of the individual case.

Secondary suture is closure of the granulating wound at a still later date, following either complete excision of the scar tissue or removal of only the epithelial border and adjacent skin. Some under-cutting of the skin on one or both sides is apt to be necessary to complete approximation. Just as with delayed primary suture, the layers of the wound may be re-united separately or *en masse* after excising the scar, or simply the skin may be sutured. Affoltz and Carrel instead of sutures use agglutinative strips which draw the skin edges together gradually. Morison uses a "corsettage" of calico strips glued on the skin. Moynihan recommends tetra cloths which also overlap skin edges and tend to prevent secondary infection.

When it is deemed not advisable to suture primarily, the aim next is toward the possibility of delayed primary suture, while observing the patient closely, clinically and bacteriologically. When there is sufficient wound disturbance to make delayed primary suture inadvisable, the next aim is to perform secondary suture as soon as the granulating wound becomes practically sterile and entirely free from streptococci.

When primary suture cannot be done, the treatment of the wound consists in applying a simple dry aseptic dressing without the use of any antiseptic other than tincture of iodine. This dressing must be renewed every few days. Carrel, however, in such cases recommends Dakin's solution or the more stable chloramine-T. At each dressing any necrotic fragments seen are removed with the scissors. The skin is washed off with alcohol or ether and then painted with a little tincture of iodine or smeared with vaseline. Lemaitre washes off the skin with sodium oleate. Wounds treated in this way depend primarily on the tissue vitality of the patient for disinfection. Antiseptics are merely an aid. Some army surgeons claim to see very little difference between results with antiseptics, with normal salt solution, or with a dry gauze dressing.

The bacteriologic condition of the wound must be determined from day to day by smears or cultures in order to ascertain the earliest possible date for secondary suture. The absence of the streptococcus is the most important bacteriologic fact to be determined before suturing. A wound freely showing pus does not need to be cultured; but when the wound surface is relatively clean, daily smears or cultures will tell best the correct time for closure, just as when the Carrel treatment is used.

In suturing, the deep layers of the wound are best united with rather fine catgut, thus aiming to leave in as small a foreign body as possible. A capillary drain consisting of strands of silkworm gut, or a small strip of gutta-percha may be inserted at the lower angle of the wound and removed between the second and fourth days and

its inserted ends examined by smear or culture. This "tell-tale" gives additional information as to the bacteriologic condition of the closed wound. If streptococci are found in this secretion, the wound had better be re-opened at once before any spread of the infection starts in. Suture is completed by applying a sterile dry dressing and immobilizing the operative region so far as possible.

POSTOPERATIVE CARE OF THE PATIENT

If the operation be properly done, after-care should be simple. If the initial surface smears and the smears from the "tell-tale" are negative for bacteria, especially cocci, the dressing need not be changed until the stitches are removed at the end of ten or twelve days. After the stitches are removed, a fresh dressing should be re-applied for a few days, but this need not be renewed once the wound is completely healed.

There are three symptoms which are danger signals during the postoperative period: fever, tachycardia, and pain. Of these, pain is, perhaps, the most important. In general the patient suffers not much from pain when twelve hours have elapsed after the operation, provided, of course, the wounded member is not moved or pressed on. Pain when present may be due to too tight a dressing, or to beginning hæmatoma formation, which means that the stitches must be removed, the wound re-opened, and the bleeder hunted for. Pain may also be due to beginning infection or merely to the nervousness of a hypersensitive and perturbed patient.

As for fever, there is often a slight rise during the first two or three days, ranging from 100° to 102½°. Then the temperature falls rapidly to normal if the case is pursuing an uneventful course. Even a single temperature of 103° should not be considered alarming. It is a prolonged rise in temperature which indicates the possibility of a wound complication and calls for re-examination of the wound. If on inspecting the wound a little redness is found over one of the stitches, gentle pressure is made around it. If this pressure elicits noticeable tenderness, the stitch should be removed. If there is no pain, the stitch may remain in place.

The pulse should normally run between 72 and 80. If it rises much above this rate even without a rise in temperature, the wound must be inspected daily if the pulse-rate keeps up distinctly above normal. As a rule, the rate rapidly drops again to normal in the favorable cases. If, however, pulse, temperature, and general condition are all abnormal, the surgeon can expect trouble and prepare by re-opening the wound.

CONTRA-INDICATIONS FOR SUTURE

When to and when not to perform primary or delayed primary or secondary suture is a matter for the exercise of the greatest judgment. It is the crux of this whole question. So far as indications for primary suture go, one can say briefly that all or almost all war wounds which can be so treated in due time should be. It is the contra-indications which it is more important to consider. Some of these contra-indications have no relation to the patient, or the wound, or the surgeon, and so scarcely apply to civilian practice. But in army service primary suture cannot be practiced when the influx of wounded is out of all proportion to the operative capacity of the unit, or when sterile supplies, or anæsthesia, or various other essential parts of the needed apparatus or material are not to be had. When fuel, or light, or water are not available, as may happen over short periods, few operations can be performed. Of the contra-indications which may apply to civilian practice we shall consider first, the absolute, and second, the relative.

1. *Absolute contra-indications:* (a) when the patient reaches the surgeon too late after the injury, with the wound already suppurating or with streaks or a zone of lymphangitis around the wound, with swelling or tenderness of the regional lymph glands; (b) when the patient arrives (even though it be after only a few hours) with the evidences of beginning gas gangrene already unmistakable; (c) when the patient's general condition is bad, pulse above 120, systolic blood-pressure below 70, or diastolic below 55; patients who come into the hospital in shock or acutely anæmic may be given salt infusion and stimulants and in a few hours be brought up to a condition which permits operation; (d) a badly shattered limb or severe injuries to the soft parts which have destroyed the main vascular or nerve supply may make primary amputation preferable. A wound lying distal to a wound in which ligature of a main artery was practiced must not be sutured primarily. These absolute contra-indications can be summed up really in two: advanced infection, or impaired circulation.

2. *Relative contra-indications:* (a) time elapsed since the injury. The report of the Interallied Surgical Commission in 1917 makes eight hours the maximum time limit during which primary suture is permissible. This limit, however, is not considered absolute by army surgeons. Moynihan says eight to ten hours, Blake eight hours, and Lemaitre has been able to suture an occasional case even up to twenty-four hours. A great deal of judgment must be used in the

individual case, depending upon the nature of the wound, the amount of contamination, and the bacteriologic findings. (b) Temperature before operation. Lemaitre advises against suturing any patient with a temperature above 38° C (100.6° F.). Such patients must be followed with special care and the wound re-opened if temperature persists or other unfavorable symptoms appear. (c) The finding of a painful tympanitic zone around the wound before the operation, or of a gelatinous or pinkish or greenish connective tissue at the time of operation, warns the surgeon to pause and consider before suturing. Prudence and conservatism are better in such a case than over-zealousness to secure a speedy and brilliant result. (d) When the wound is infiltrated with blood and clots it had better not be sutured unless every bit of the hæmatoma has been excised. This is particularly true when the rupture of a large vessel requiring ligation is the source of the hæmatoma. (e) The presence of extensive necrosis due to explosion, beginning gangrene, or large quantities of clothing, contra-indicate primary suture, though delayed primary suture may subsequently be successful. (f) A grayish appearance to all or most of the wound track indicates that suture had better be postponed until the wound cleans up. (g) When the wound is peppered with a multitude of small fragments, as in a hand grenade explosion, or buck-shot wound or the like. In such cases the general vitality of the whole region is apt to be markedly diminished and therefore the reaction of the wound should first be studied before attempting to close it. (h) When the whole wound track has not been seen either because difficult of access or because the path could not be followed at operation, it is better to delay suture than to risk a deep muscle phlegmon which may make considerable headway before discovered. (i) If there is any doubt about the asepsis of the instruments or material used or if there has been any surgical slip in asepsis, it is better to leave the wound open and await events. (j) When the surgeon is in doubt of himself, while he is new at the method, if the case appears in any way unfavorable and the surgeon is not certain in his mind whether to suture or not suture, it is better to delay closure and await development. This is a very important contra-indication. Delayed suture sacrifices chiefly time; ill-advised primary suture sacrifices both limb and life. One should not be too ambitious at the start, and after finding his secondary sutures and the delayed primary sutures progressing nicely he may then pass on to the primary suture, first in the simpler and then in the more difficult cases. Bacteriologic examination should not be omitted, and if streptococci are found, suture should not be done.

RÔLE OF THE LABORATORY

The laboratory is of first importance. It is indispensable for primary suture, as well as for delayed primary and secondary suture. Since Tissier showed the value of the bacteriologic study of wounds and the significance of the rôle played by the streptococcus, nearly all surgeons have come to recognize the laboratory's importance. The bacteriologic examination gives us the key to certain failures which previously could not be understood. After the streptococcus, the staphylococcus is the most noxious organism, and the other bacteria of relatively less importance. Lemaitre thinks that occasionally a wound with streptococci in it may heal; but the experience of most surgeons is to the contrary. A little longer waiting and delayed suture will give about as good a result. Impatience may lead to a fatality.

CONCLUSIONS

A technique is taught by example and not by words. It is learned from cases and not from lectures. Surgeons with extensive experience at the front still differ in their methods of wound treatment; and yet the results with the Carrel method, with the method of primary or delayed primary suture, or the Wright or other antiseptic methods do not differ so greatly as do the results obtained by different surgeons of unequal experience using the same method.

Primary suture is a distinct and valuable addition to our technique of wound treatment. Its use appears to be on the increase. It has its over-enthusiastic and over-zealous advocates, as does the Carrel treatment and other methods; but it is a procedure even better suited to civilian treatment of wounds than to army treatment. Its opponents claim that it necessitates the excision of considerable tissue, at least more tissue than would be lost by chemical disinfection; but on the other hand Carrel performs and recommends excision in all his cases except those which enter the hospital actually suppurating. There are no doubt surgeons who excise too much. Some others excise too little. Clean perforating wounds which would likely have healed primarily under a simple occlusive dressing no doubt have been excised when they should have been let alone. Primary and delayed primary suture are only varieties of wound treatment. They are not a substitute for all other methods. But when used with care and discretion in proper

surroundings and with proper laboratory aids by surgeons of mature experience and judgment, they constitute an important and welcome addition to our surgical resources.

BIBLIOGRAPHY

ACKERLEY, R. The bacterial infections of projectile wounds. Lancet, Lond., 1915, i, 992.

AIMES, A. Present status of treatment of wounds. Progrès méd., Par., 1918, xxxiii, 41.

AIMES, A., and SARI. Primary suture of wounds and early evacuation. Progrès méd., Par., 1918, xxxiii, 240.

ALESSANDRI, R. Emergency treatment of deep wounds. Policlin., Roma, 1917, xxiv, sez. prat., 41.

ANDERSON, C. M., COOPER, P. R., and others. The treatment of wounds in the present war. Brit. M. J., 1914, ii, 949.

ANDRIEU, J. Comment traiter les plaies suppurantes causées par les projectiles de guerre. Paris méd., 1915, xvii, 328.

AXHAUSEN. Die moderne Wundbehandlung. Fortschr. d. Med., 1910, No. 25, 27.

Idem. Zur Versorgung der Schussverletzungen der Extremitaeten. Deutsche med. Wchnschr., 1915, xli, 640.

Idem. Die Behandlung der Schaedelschuesse. Ztschr. f. Aerztl. Fortbild., 1915, xii, 464.

BALL, W. G. Delayed primary suture of wounds. Lancet, Lond., 1918, June 29, p. 898.

BÁRÁNY. Primaere Wundnaht bei Schussverletzungen, speziell des Gehirnes. Wien. klin. Wchnschr., 1915, xxviii, 525.

BÉRARD, L., and WULLYAMOZ. Quand et comment faut-il extraire les projectiles de guerre? Bull. Acad. de méd., Par., 1915, lxxiii, 404.

BLAKE, J. A. Gunshot fractures of the extremities. Masson et Cie., Paris, 1918.

BOWLBY, A. Primary suture of infected wounds at the front in France. Brit. M. J., 1918, i, 333.

BROCK, S. Excision and suture of superficial gunshot wounds under local anæsthesia. Surg., Gynec. & Obst., 1918, xxvi, 565.

CAIRD, F. M. An address on the principles of wound treatment as established by Lister and the subsequent modifications in treatment. Brit. M. J., 1914, ii, 872.

CANESTRO, C.: Treatment of large septic wounds by means of irrigation with capillary drainage. Policlin., Roma, 1917, xxiv, sez. prat., 1257.

CARREL, A., and DEHELLY, G. Infected wounds. Paul B. Hoeber, New York, 1917.

CARREL, DEHELLY and DUMAS. Wound sterilization and immediate closing. Bull. Acad. de méd., Par., 1916, p. 32.

CHALIER, A. Primary suture of wounds. Lyon chirurg., 1917, xiv, 35.

Idem. Retarded primary suture of wounds. Progrès méd., Par., 1918, xxxiii, 229.

CHEYNE, W. W. Remarks on the treatment of wounds in war. Brit. M. J., 1914, ii, 865.

Idem. Sir Almroth Wright's lecture on the treatment of wounds in war. Lancet, Lond., 1915, i, 961.

CHEYNE, W. W., BASSET-SMITH, P. W., and EDMUNDS, A. Preliminary report of a committee appointed by the Director-General of the Medical Dept. of the Navy in December, 1914, to inquire into best method of treating wounds sustained in action, especially during the early period after their infliction. J. Roy. Nav. M. Serv., Lond., 1915, i, 103.

CHEYNE, W. W., POWER, D' A., and others. Synopsis of a discussion on the treatment of wounds. Med. Mag., Lond., 1914, xxiii, 678.

CHIARI. Pathogenese der Meningitis bei Schussverletzungen des Gehirns. Deutsche med. Wchnschr., 1915, xli, 935.

Conclusions voted by Interallied Surgical Congress in relation to treatment of wounds in war. Arch. méd. belges, 1917, lxx, 769.

COOPER, P. R. The treatment of wounds in the present war. Brit. M. J., 1914, ii, 1047.

CRILE, G. W. Restoration and repair of wounds, combatting contamination and infection. Surg., Gynec. & Obst., 1918, xxvi, 372.

CUNÉO, B. Disinfection and immediate or early reunion of recent wounds. Bull. Soc. de chir., 1916, xlii, 225.

DEHELLY. Early closing of gunshot wounds and abortive treatment of infection. Bull. Acad. de méd., Par., 1916, p. 505.

DEHELLY, G.: Surgical closure of infected wounds. Ann. Surg., Phila., 1918, lxviii, 430.

DELORME, E. Considérations générales sur le traitement des blessures de guerre. Presse méd., Par., 1914, xxii, 650.

DEMMLER, A. Present status of treatment of wounds. Progrès méd., Par., 1917, xxxii, 303.

DEMMLER, A. Primary operations for infected wounds in war. Progrès méd., Par., 1918, xxxiii, 158.

DÉZARNAULDS, P. Evolution and treatment of gunshot wounds and shell varieties. Rev. de chir., Par., 1916, li, 164.

Idem. Primary suture of wounds. Presse méd., Par., 1917, xxv, 242.

DON, A. Should all bullets and pieces of shell be removed? Brit. M. J., 1915, i, 698.

DUJARIER, C. La suture osseuse dans les suites de plaies de guerre. Bull. Acad. de méd., Par., 1915, lxxiv, 331.

DUVAL, P. The treatment of war wounds of the soft parts. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 1739.

EASTMAN, J. R. Treatment of gunshot wounds. Surg., Gynec. & Obst., 1917, xxiv, 108.

ECCLES, W. McA. A clinical lecture on gunshot wounds. St. Barth. Hosp. J., Lond., 1914, xxii, 69.

EDINGTON. Traumatic implantation of epidermis in the track of wounds. Brit. M. J., 1916, January 1.

EGEBERG, J. C. Method of suturing Y-shaped wounds. Calif. St. J. Med., 1918, xvi, 464.

EHRENPREIS. Primary reunion of infected wounds. Presse méd., Par., 1918, xxvi, 395.

Idem. Secondary suture of wounds. Presse méd., Par., 1918, xxvi, 490.

EISNER, E. Ueber Heftplasterverbaende zur Beschleunigung der Heilung von Schusswunden. Deutsche Ztschr. f. Chir., 1915, cxxxii, 83.

EMERSON, M. L. Bismuth iodoform petrolatum paste in the treatment of recent wounds. J. Am. M. Ass., 1918, lxx, 79.

ENGELHARDT. Nouveau traitement des plaies de guerre. Rev. gén. de clin. et de thérap., Par., 1915, xxix, 365.

EVERIDGE, J. Primary suture of wounds. Brit. M. J., 1918, ii, 9.

FAUNTLEROY, P. C. Gunshot and shell wounds. Med. Rec., 1914, lxxxvi, 1035.

FOCQUET, R. Present status of primary suture of wounds. Arch. méd. belges, 1917, lxx, 148.

FRASER, F. Primary and delayed primary suture of gunshot wounds; report of research work at a casualty clearing station December 27, 1917 to March 1, 1918. Brit. J. Surg., 1918, vi, 92.

GALLOWAY, A. R., SCHOFIELD, G., and others. The treatment of wounds in the present war. Brit. M. J., 1914, ii, 900.
GANGOLPHE, M. Gunshot injuries of bones and joints. Lyon chirurg., 1915, xii, 443.
GAUDIER, H., and MONTAZ, R. The primary immediate suture of war wounds. Lyon chirurg., 1916, xiii, 685.
GAULTIER. Abortive treatment of septic wounds. Paris méd., 1916, p. 343.
GELINSKY, E. Prevention and treatment of infection in wounds. Berl. klin. Wchnschr., 1915, lii, 72.
GRAY, H. M. W. Treatment of gunshot wounds by excision and primary suture. J. Roy. Army M. Corps, Lond., 1915, xxiv, 551.
Idem. Treatment of gunshot wounds by excision and primary suture. Brit. M. J., 1915, ii, 317.
Idem. Treatment of infected gunshot wounds. Brit. M. J., 1916, January 1.
GRÉGOIRE, R., and MONDOR, H. Suture of infected wounds in war. Presse méd., Par., 1918, xxvi, 22.
GROSS, G. Bull. et mém. Soc. de chir. de Par., 1915, January 27.
Idem. Paris méd., 1916, October 18.
Idem. Bull. et mém. Soc. de chir. de Par., 1917, July 4, October 10 and 23.
Idem. Bull. et mém. Soc. de chir. de Par., 1917, March 7.
Idem. Primary suture of infected wounds. Presse méd., Par., 1918, xxvi, 225.
Idem. Primary suture of infected wounds. Paris méd., 1918, viii, 145.
Idem. Primary suture of wounds. Arch. de méd. et pharm. mil., Par., 1918, lxix, 481.
GROSS, G., and others. Primary suture of war wounds. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 1806.
GROSS and HOUDARD. Bull. et mém. Soc. de chir. de Par., 1917, May 30 and December 5.
GURD, F. B. Technique of infected wound closure, more especially compound fractures. Lancet, Lond., 1918, May 25, 731.
HABERER, H. VON. Treatment of infected gunshot wounds of bones and joints. Med. Klin., Berl., 1915, xi, 179.
HALSTEAD, A. E. Personal communication.
HARDOUIN, P. The immediate treatment of wounds in war. Lancet, Lond., 1915, ii, 236.
HARTMANN, H. Blessures de guerre. Rev. scient., Par., 1914, ii, 209.
HAYCRAFT, J. B. Soap and water treatment and primary suture of infected wounds. Brit. M. J., 1918, i, 80.
HERZFELD, J. Schussverletzungen. Deutsche med. Wchnschr., 1915, xli, 31.
HEY, W. H. Method of early closure of recent gunshot wounds. Brit. M. J., 1917, ii, 445.
HEY-GROVES, E. W. Some of the problems of gunshot fractures. Lancet, Lond., 1914, ii, 1139.
Interallied Surgical Commission on treatment of wounds. Bull. méd., Par., 1917, p. 125.
KOERTE, W. Importance of immobilization in the treatment of gunshot wounds of bones and joints. Berl. klin. Wchnschr., 1916, liii, 1, 30.
KRAUSS, F. Zur Wundbehandlung. Med. Klin., Berl., 1914, x, 1848.
LAGARDE, L. A. Infection of gunshot wounds. Internat. Abst. Surg., 1915, xxi, 241.
LEE, W. E. Secondary suture of infected wounds after their chemical sterilization with chloramine-T. Internat. Clinics, 1918, i, 174.
LEGRAND. Color fixation of tissues and primary suture. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 2160.
LEMAITRE, R. Primary suture of wounds; study of 2,537 cases. Lyon chirurg., 1918, xv, 65.
Idem. Lectures on primary suture of war wounds at army sanitary school, A. E. F., 1918.
LERICHE. Treatment of infected wounds. Lyon chirurg., 1916, p. 65.
Idem. Operative sterilization without antiseptics in recently infected wounds. Lyon chirurg., 1916, p. 676.
LITTLE, A. G. First aid in contused and lacerated wounds. J. M. Ass. Ga., 1917, vi, 248.
LOMBOT. Bull. et mém. Soc. de chir. de Par., 1916, June 28.
MAKINS, G. H. The treatment of gunshot wounds in the present campaign. Brit. M. J., 1914, ii, 860.
MANCINI, C. Adhesive plaster treatment of wounds. Policlin., Roma, 1918, xxv, sez. prat., 773.
MARQUIS, E. Present status of treatment of wounds. Rev. de chir., Par., 1916, li, 384.
MASSIE, R. Brilliant green in recently inflicted wounds. Lancet, Lond., 1918, May 4, 635.
MONGIE. Secondary suture of war wounds. J. de méd., Bordeaux, 1918, lxxxix, 291.
MORRISON, J. T. On the use of secondary suture. Brit. J. Surg., 1917, iv, 414.
MORRISON, J. T., HARTLEY, J. N. J., and BASHFORD, E. F. Delayed primary suture of wounds. Lancet, Lond., 1918, April 13, p. 534.
MORTON, C. A. The treatment of wounds. Lancet, Lond., 1915, ii, 305.
MOYNIHAN, B. Treatment of wounds. Brit. M. J., 1916, i, 333.
Idem. Treatment of gunshot wounds. Surg., Gynec. & Obst., 1917, xxv, 583.
MUNROE, H. E. Remarks on the character and treatment of wounds in war. Canad. M. Ass. J., 1915, v, 962.
OKINCZYC, J., and DAUDIN-CLAVAUD, H. Operative indications for first treatment with multiple war wounds. Arch. de méd. et pharm. mil., Par., 1917, lxviii, 833.
PARIN, M. Electric sterilization of wounds. Presse méd., Par., 1918, xxvi, 583.
PENHALLOW, D. P. Secondary sutures of gunshot wounds. Mil. Surgeon, 1917, xl, 274.
PHILLIPS, J. Closure of war wounds in home hospitals. Lancet, Lond., 1917, ii, 528.
PICOT, G., and MICHEL, R. Suture of wounds under bacterial control. Arch. de méd. et pharm. mil., Par., 1917, lxvii, 657.
PICQUÉ, L. Du rôle du projectile dans l'infection des plaies (éclats d'obus, balle de shrapnell). Bull. et mém. Soc. de chir. de Par., 1914, xl, 1219.
PICQUÉ, R. General rules for the immediate treatment of war injuries in an ambulance at the front. Bull. et mém. Soc. de chir. de Par., 1916, xlii, 460.
PISANO, G. Immediate intervention for war wounds. Policlin., Roma, 1917, xxiv, sez. prat., 537.
PISANO, G. Early operations for wounds. Gazz. de osp., Milano, 1918, xxxix, 525.
POLICARD, A., and DESPLAS, B. Researches on the secondary suture of war wounds. Lyon chirurg., 1916, xiii, 43.
PURVIS, W. P. The treatment of gunshot wounds. Med. Mag., Lond., 1915, xxiv, 7.
QUÉNU, E. Des indications opératoires dans le cas de projectiles de l'articulation du genou. Bull. et mém. Soc. de chir. de Par., 1914, xl, 1268.
Idem. Traitement des plaies gangréneuses (par projectiles de guerre). Bull. Acad. de méd., Par., 1915, lxxiii, 108.
Idem. Rev. gén. de clin. et de thérap., Par., 1915, xxix, 56.

REVERCHON, H. L., VIGNAT, and VAUCHER. Early sterilization of war wounds with hot air or oxygen. Presse méd., Par., 1915, xxiii, 425.

SALINARI, S. The study and treatment of gunshot wounds of the limbs. Riforma med., 1917, xxxiii, 654.

SCHISSI. Treatment of war wounds. Gazz. d. osp., 1917, xxxviii, 433.

SHERMAN, W. O. Carrel's method of sterilization, its use in military, industrial and civil practice. Penn. M. J., 1917, xx, 643.

SPEED, K. Prompt removal of foreign bodies; arguments in favor. J. Am. M. Ass., 1917, lxix, 1079.

TAVERNIER, L., DESPLAS, B., and POLICARD, A. Early secondary suture of war wounds. Lyon chirurg., 1917, xiv, i, 12.

TAYLOR, K. Infected wounds and tissue fragments. Ann. Surg., Phila., 1916, lxiv, 641.

TAYLOR, W. H., and TAYLOR, N. B. Liquid-tight closure and treatment of wounds in war. Lancet, Lond., 1917, September 22, p. 452.

Idem. Liquid-tight closure and treatment of infected wounds. Lancet, Lond., 1918, May 11, p. 671.

TISSIER, H. Ann. Inst. Pasteur, 1915, December.

Idem. Ann. Inst. Pasteur, 1917, April.

Idem. Bull. méd., Par., 1918, October.

Idem. Arch. de méd. milit., 1918, December.

TUFFIER. Treatment of war wounds; prophylaxis of infection and disinfection. Arch. de méd. et pharm. mil., Par., 1918, lxix, 4.

TURNER, G. I. Brilliant green, flavine, and other stains in treatment of wounds. Russk. Vrach, 1918, xvi, 481.

UFFOLTZ. Secondary union of war wounds by first intention in the field hospitals. Bull. Acad. de méd., Par., 1916, lxxv, 335.

VINCENT, B., and GREENOUGH, R. B. Gunshot wounds of the soft parts. Boston M. & S. J., 1916, clxxiv, 153.

VINCENT, H. Prophylaxis of infected wounds in war. Presse méd., Par., 1917, xxv, 65.

WATSON, C. G. The treatment of wounds in war. Lancet, Lond., 1915, i, 43.

WRIGHT, A. E. Wound infections and their treatment. Brit. M. J., 1915, ii, 629, 670, 717.

ZAPELLONI. Primary suture of wounds. Policlin., Roma, 1918, xxv, sez. prat., 1002.

ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY—SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Warbasse, J. P.: The Postoperative Treatment of Abdominal Cases. *Am. J. Surg.*, 1918, xxxii, 289.

The ordinary uncomplicated operation brings the patient back to bed in good condition. The patient should be taken to a quiet room and kept in a supine position until the anæsthetic depression has worn off. As soon as the nausea has worn off, fluids may be given and the head elevated. On the second day milk may be given and then the diet steadily increased. The patient may be allowed in a chair on the eighth or tenth day, and at the end of twenty-one days may be permitted about his business.

Special measures may be employed. The placing of a rectal tube permits the escape of gas. Sand bags placed on the abdomen to increase intra-abdominal pressure aid in expelling gas and are especially indicated when large abdominal tumors have been removed.

Patients are better off without morphine, but it may be given for the first two days in doses of 1:12 grains every three hours when pain, restlessness, and sleeplessness are present. If left alone, the bowels will move by the fourth day and no harm results, but to move the bowels a dose of paraffin oil or 1½ ounces of castor oil and 1 dram of compound tincture of cardamon may be given. Fumes of vinegar relieve ether nausea.

Complications may require care. Vomiting may be relieved by elevation of the head, keeping the stomach quiet, gastric lavage, enema, and relief of intra-abdominal pressure as from drains, collection of pus, or a spreading peritonitis. Meteorism may be relieved by elevation of the upper part of the trunk, sips of hot water, hot stupes to the abdomen, enema containing turpentine, magnesium sulphate and glycerine or milk and molasses. Acute dilatation of the stomach requires immediate washing of the stomach. For pain morphine may be given, but not repeatedly. For shock proctolysis of glucose or saline solution is indicated. Other methods for combating shock are filling the abdominal cavity with normal saline before closing and also filling the large bowel with normal saline. For thirst fluids by mouth, under the skin, or per rectum are indicated. Retention of urine can frequently be relieved by a warm enema, warm water to the pubic region, and as a last resort catheterization. Acidosis should be combatted by sodium bicarbonate. Other indications for treatment are postoperative hæmorrhage, ileus, peritonitis, phlebitis, and pneumonia.

The time for permitting a case to get up and for postoperative feeding depends upon the nature of the case. I. E. Bishkow.

ASEPTIC AND ANTISEPTIC SURGERY

Crile, G. W.: Treatment of 420 Infected Wounds Under Battle Conditions Arriving on the Average of Fifty-Eight and One-Third Hours After Injury, Without Previous Surgical Treatment. *Canad. M. Ass. J.*, 1918, viii, 961.

These cases came to the operating table for first treatment varying from 24 to 150 hours after injury. All the wounds presented heat, swelling, tenderness, redness, and a discharge of purulent fluid. All operative cases were prepared under anæsthesia by: (a) scrubbing thoroughly a wide field with soap and water; (b) shaving; (c) 5 per cent sodium carbonate; (d) ether; (e) alcohol.

Every wound that had not undergone abscess formation or new tissue formation was treated by complete surgical revision. Devitalized tissue was treated in an opportunist manner. Little skin was excised. Ample exposure by vertical incisions was made. To guard against the complications of the days following, fascia overlying swollen muscle was incised, and skin and fascia incised where swelling and tenderness might develop.

Five plans of treatment suitable to rush periods were tried: (1) surgery plus dry gauze dressing; no antiseptics; (2) flavine; (3) dichloramin-T chlorocosane; (4) Wright's hypertonic pack; (5) alcohol.

Of 420 operative cases, 44 were immediately sutured, all proving successful. Of the 67 marked for delayed suture, 91 per cent healed without requiring the removal of any sutures, 6.1 per cent were partial successes, and 2.9 per cent were failures. There were 4 deaths, or 0.9 per cent mortality. There were no cases of bacteræmia or septicæmia. I. E. Bishkow.

Dunlop, J.: The Carrel-Dakin Treatment at Oxford; an Observation of the Carrel-Dakin Method of Treating Chronic Wounds in an Orthopedic Center in England. *Am. J. Orthop. Surg.*, 1918, xvi, 495.

This report is confined to cases of chronic wound suppuration of several months' duration which had been subjected to many of the treatments in vogue, such as "bipp," flavine, etc. In each instance the process of repair and healing had come to a standstill, or infection had lighted up and it was a question of saving life. Practically all cases confined to

bed consisted of such types as compound fractures of the upper and lower arm, thigh and leg; a few were simple flesh wounds, and some were bone grafts which had become septic weeks afterward. All were very chronic in character, or acute exacerbations in old scar tissue.

All cases were thoroughly opened up and dressed while still under the anæsthetic. On returning to bed, the apparatus is completely installed. Daily dressings are begun, starting the day after operation, and all dressings are done by the surgeon who operated upon the case. The technique is very carefully carried out. The skin about the wounds is washed with alcohol, the wounds sponged out with Dakin's solution, and tubes then put in place. The appearance of the wounds are much the same as flesh wounds treated by the Carrel-Dakin method. Within a day or two they show a yellowish-gray coating, probably due to coagulated albuminous matter. Within a few days this surface becomes red in spots, continuing until the entire surface assumes the brilliant red so characteristically described by Carrel. The discharge is at first a milky thin fluid, but gradually becomes thick and tenacious, and finally disappears, a normal granulating area remaining. The condition of the bone was not as described by Carrel, the thin hard shell of bone gradually lifting away during the process of sterilization.

The rapid decrease in the bacterial counts is much the same as in fresh wounds, only taking a longer time to accomplish. Complete sterilization is very difficult to obtain, and flare-ups are quite common. The amount of bleeding at dressings is about the same. The granulations are not sensitive and dressings are painful only where there are deep sinuses or close proximity to nerves. The greatest difficulty encountered was that of preventing sinus formation, especially where there is complete absence of a portion of the bone shaft. It is also difficult to decide when to remove the tubes and allow the space to fill with granulation tissue. No attempt was made to close these wounds with suture, although a number were drawn together by strapping. Unequal pressure on the tubes is to be avoided, as this has a tendency to unequally distribute the fluid.

J. J. KURLANDER.

Rendu, A.: The Value of the Carrel Method Applied to Suppurating Wounds at a Base Hospital (Sur la valeur de la méthode Carrel appliquée aux blessés suppurants d'un hôpital de l'arrière). *Lyon chirurg.*, 1918, xv, 426.

The author was in charge of an auxiliary war hospital and for the past two years has instituted the Carrel-Dakin method in the treatment of suppurating wounds, having studied the method at Carrel's hospital at Compiègne. His report is based upon the treatment of about 200 wounds.

The Carrel method has given good results in extensive superficial wounds. In fractures the results differed according to the bones involved. They were good for the humerus or for a single bone of the forearm; slower for both bones of the forearm or leg. Complete sterilization was never obtained in fractures of the femur. The method failed in osteitis and osteomyelitis and subsequent fistulæ; in articular fractures where the irrigation did not obviate resection; also in purulent pleurisy.

The author recommends the following precautions: covering the skin about the irrigated wound with vaseline to prevent possible burning; careful hæmostasis of irrigation is to be established immediately after intervention, to avoid secondary hæmorrhage which Dakin's fluid favors by dissolving blood-clots; not to omit the usual drainage at the lowest point, as the Carrel tubes do not obviate the use of drainage tubes. W. A. BRENNAN.

Meltzer, S. J.: The Application of a Concentrated Solution of Magnesium Sulphate to Scalds and Burns. *J. Pharmacol. & Exp. Therap.*, 1918, xii, 211.

The experiments to test the action of concentrated solutions of magnesium sulphate were made on non-injured and non-shaved rabbits' ears.

Both ears were submerged in hot water, then one ear immediately submerged in 25 per cent magnesium sulphate and the other in a solution of sodium chloride, and kept for two or three hours. The ear submerged in magnesium sulphate was apparently normal, while the ear in the sodium chloride solution showed inflammatory reaction.

The author concludes that magnesium sulphate gives good results when used early in scalds or burns. I. E. BISHKOW.

Tuffier, T., and Desmarres, R.: The Progress of Cicatrization of War Wounds and the Agents Capable of Influencing It (Sur la marche de la cicatrisation des plaies de guerre et les agents capables de l'activer). *J. de chir.*, Par., 1918, xv, 1.

The authors have endeavoured to find in what degree physical or chemical agents could influence the progress of cicatrization in sterilized wounds. The study was based on the known evolution of normal cicatrization which has already been investigated at the Rockfeller Institute at Compiègne, France, under the direction of Carrel. It was known that a superficial sterile wound would cicatrize in a given time which could be determined from a mathematical formula. A theoretic curve of cicatrization could be traced, so that it was possible to predict the date at which complete cicatrization would be effected.

The authors were able to verify that superficial wounds, treated according to the Carrel-Dakin method, exactly followed the theoretic curve. In deep wounds they found that cicatrization was as quick as, and often even more rapid than, in superficial wounds of the same contour. A paradoxical fact observed, from which no general conclusion is drawn, was that the progressive union obtained by means of an elastic corset may be superior to the partial union obtained by suturing.

The authors' study has suggested that the blood brings to the area of the wound those chemical substances necessary for retraction of the wound and for epithelial proliferation. When the biologic process is not disturbed by infection, etc., it is regular and the complete time necessary for cicatrization can be predicted. The existence of physical and chemical activating agents have been demonstrated to the authors by certain clinical facts. In the case of some skin graft experiments, the grafts were completely absorbed but the authors think they had brought to the wound certain substances activating cicatrization.

Further results noted by the authors were that a simple dry absorbent dressing on a sterile wound brings about cicatrization a little more rapidily than the Dakin method; that the use of chemical bactericidal compositions advance the time of cicatrization only slightly; while heliotheraphy associated with the Dakin treatment shows a considerable gain in the time required for cicatrization.

The authors' article is illustrated by a large number of cicatrization curves. W. A. BRENNAN.

ANÆSTHETICS

Richardson, F. L.: Heart Lesions in Anæsthesia. *Med. Press*, 1918, cvi, 442.

The author states that while patients with heart lesions undoubtedly offer greater risks from anæsthesia than healthy individuals, yet if they are in condition to stand the operative procedure, the administration of the anæsthetic need not be prohibitively dangerous to life. More of these cases have died from the effect of the operation itself or from poorly given anæsthesia than as the result of the anæsthetic itself. Valvular heart lesions perfectly compensated, and with a reasonable margin of safety have offered very little danger from the anæsthesia. The nearer the over-stepping of the line of compensation, the more the danger from anæsthesia. Provided the heart lesion does not interfere with the ordinary affairs of life, it will not interfere with the taking of an anæsthetic. Chronic valvular disease is not as dangerous as are endocardial and myocardial degenerations; angina pectoris is perhaps the most dangerous.

In the presence of serious disease of the heart, the one fundamental principle should be the maintenance of blood-pressure as near the level which is normal for that individual as possible; this principle should be kept in mind in the pre-operative treatment, the operative procedure, the selection and administration of the anæsthetic, and in the post-operative care. When possible, patients should be put to bed for a number of days before the operation in approximately the position they will have to assume after the operation, in order to observe the heart action under these conditions.

The author lays great stress on the importance of the diastolic blood-pressure as an indication of the condition of the heart muscle to withstand operative procedure. For serious operations, fats are reduced and carbohydrates increased. Ten to twenty grains of sodium bicarbonate are given two hours before operation; cathartics should never be given unless the patient is in the habit of taking them.

Immediately before the induction of anæsthesia every precaution should be taken to allay the natural fear and uneasiness incident to operative procedures. Morphine and atropine as preliminary medication should be given sufficiently early to allow of their maximum action before the anæsthetic is started. The position on the operating table should be comfortable. If it is incompatible with the performance of the operation itself, the position should be gradually changed after the induction of anæsthesia. Any sudden change may cause serious interference with breathing or heart action.

The author proceeds to a discussion of the relative merits of methods of anæsthesia and anæsthetic drugs. Local anæsthesia if it enables the operation to be done without pain offers the least danger to the patient. Fear or pain are factors which may tend to raise blood-pressure as much as ether or nitrous oxide. Spinal anæsthesia should never be given when compensation is broken or when the margin of safety is narrow. Patients with arteriosclerosis stand spinal anæsthesia quite well. Scopolamine is a drug too depressant and too uncertain in its action to be used as a pre-anæsthetic in cases with serious heart lesion.

The author considers gas-oxygen far from safe in cases of broken compensation or angina pectoris. Short operations requiring no muscular relaxation may be done with less disturbance to the patient under gas-oxygen than under any other form of anæsthesia. It must be remembered that great changes in the condition of the patient may occur with alarming rapidity and without warning. In the author's hands almost as many patients vomit after prolonged gas-oxygen anæsthesia as after ether, but the duration and severity of the vomiting are less.

Ether may be so given that it will have little effect upon the damaged heart during the course of the operation. Unfortunately its administration is followed by a period of depression which the damaged heart will not survive.

Chloroform, while not unpleasant to take and quicker in action than ether, lowers the blood-pressure. The highest percentage of fatalities in patients with heart lesions occurs during the induction period when, without warning, the heart action stops. Almost of equal danger is the period of from three to five days after the operation when the toxic action of the chloroform on liver, adrenals, and heart muscle manifests itself. Theoretically one should be able to combine chloroform with ether. The various mixtures have been tried and found wanting. The author believes that in some cases the addition of a little chloroform to the mask is very useful when inducing anæsthesia with ether but the mixture should be made on the mask as indicated and not according to any preconceived formula.

The postoperative indications in heart cases are to prevent any unnecessary overload and to maintain the nourishment of the patient at a high level. Water should be freely given by mouth, by rectum, subpectorally or intravenously. Food of real caloric value should be administered within eighteen hours of the operation. The urine should be carefully watched for acetone, and when present in rising quantities, should be combatted with sodium bicarbonate in small and repeated doses. Heart stimulants are useless. More heart cases require rest after the operation than require stimulation. Morphine is most useful. ELLIS FISCHEL.

SURGICAL INSTRUMENTS AND APPARATUS

Goldbloom, A.: A New Apparatus for Puncture of the Superior Longitudinal Sinus. *Am. J. Dis. Child.*, 1918, xvi, 388.

Tobler was the first to submit measurements of anatomic relations of the superior longitudinal sinus as a location for obtaining blood and administering fluids in young infants. Puncture is best made in the midline at the posterior angle of the fontanelle, the distance from the skin to the lumen of the vein being 2 to 5 mm., and the depth of the sinus 4 to 7 mm. Attempts have been made to devise forms of apparatus to make the puncture safe by steadying the needle and guarding the depth of penetration.

The author describes an apparatus consisting of an 18-gauge needle, with obdurator, with its hub screwing into a cylinder. The latter fits into a bore in the middle of an aluminum block. The block carries a set screw securing the cylinder and setting the needle at any desired length, this being indicated by a gauge on the cylinder.

To puncture the sinus, the needle is set at about 4 mm. in young infants, and at 6 mm. in older, and secured by the set screw. The sinus is entered at the posterior angle of the anterior fontanelle, at right angles to the long axis of the skull. The block, grasped by the corrugations on its side, prevents the child's movement from displacing the needle. Upon removal of the obdurator, which has prevented blocking of the needle, the crying of the infant causes the blood to flow. Apparatus for intravenous injection is attached to the hub.

The apparatus is to be recommended for its small cost, simplicity, easy manipulation, and safety from dangers by use of ordinary needles in this procedure. V. E. DUDMAN.

Turner, P.: The Triangle Splint in the Treatment of Compound Fractures of the Humerus. *Brit. M. J.*, 1918, ii, 711.

The advantages of the triangle splint, as compared with the Thomas splint in the treatment of certain types of compound fracture of the humerus, are herein set forth.

First, prolonged stay in bed is unnecessary. Prolonged fixation of the elbow in the extended position is not required. Correction of pronation of the hand and of consequent internal rotation of the lower fragment is more readily maintained.

Each splint is made to order; an accurate fit is thus assured. A preliminary X-ray is needed to determine the amount of abduction necessary. The principle of the splint is to fix the injured limb in abduction with slight external rotation. Firm adjustment of the splint is necessary to prevent pain, displacement of the fragments, and constant readjustment.

The triangle splint was originally used in fractures of the surgical neck, for the purposes of maintaining abduction and external rotation, the position the upper fragment always tends to assume. When the displacement is serious, the comminution great, or where there is a septic wound, it is better to use a Thomas splint for about three weeks, or until the wound reaction has subsided, and until there is some attempt at union. Then the triangle splint may be substituted.

The triangle splint is not suitable in that class of cases in which there is a large bone defect, in cases with extensive wounds, or in those cases where there is danger of secondary hæmorrhage. It is best suited for the permanent treatment of fractures of the middle third of the shaft, where the displacement is slight, and wound infection is not serious.

The triangle splint is easily made. The elbow is maintained at right angles; and while the shoulder is rigidly fixed, motion in the wrist and fingers is permitted. The patient is ambulatory. Transportation is easy. J. R. BUCHBINDER.

SURGERY OF THE HEAD AND NECK

HEAD

Guisez: Nasal and Paranasal Plastics for War Injuries (La restauration nasale et paranasale dans les blessures de guerre). *Paris méd.*, 1918, viii, 198.

To repair a defect in the middle part of the nose Guisez uses a strip taken from the forehead under which a cartilage graft cut from the seventh or eighth rib has first been inserted. The strip from the forehead is cut horizontally a little above the eyebrow, and the subcutaneous layers are cleared away to make a bed for the graft. The repair operation is done one and a half months later, after removing the nasal cicatrix and trimming away irregularities. When the loss is very extensive, a double strip is used, a V-incision (the apex of the V between the eyebrows) being made around the nose, and the region within regularized as before.

For simple losses in the alæ and nares a horizontal

incision is made in the upper nose region and the ridge skin then cut medially down to the tip; the skin is then pulled down to cover defects. This may if necessary be supplemented by a strip cut from the cheek which is reversed, its outer surface thus forming the inner surface of a defect in the nostril without retraction.

Defects about the point of the nose are the most difficult to correct. They are usually accompanied by lesions of the septum. Guisez says that such a defect may be remedied by cutting a kind of triangular flap out of the remaining septum, the base of this being left adherent to the floor of the nasal fossa for about 2 cm. This triangular piece is easily pivoted about its base so that its posterior angle becomes superior. The alæ are mobilized about it.

The method is shown by a number of illustrations. In its new position the triangular flap takes the place of the defective septum and can be covered over with skin or by the methods above referred to. The subseptum may be reconstituted by two vertical strips cut in the upper lip beneath the nostrils, these being sutured back to back and turned upward.

The paranasal defects met with are almost always following traumatic sinusitis. They are filled either by cartilage, bone, or fat grafts covered by skin as before. Guisez illustrates a case of a mediofrontal orifice following injury which destroyed the ethmoid and the middle part of the frontal bone. It was closed by strips cut in the vicinity, the cutaneous surface being turned in; then the skin above and below it was pulled together and sutured over the reversed strip.

Guisez always uses a general anæsthetic by the intubation method. He pays particular attention to the nasal respiration. He avoids all compressive dressings in the vicinity of the strip so as to prevent circulatory disturbances in them which would cause gangrene. All sutures are cut early, from the third to the fifth day. W. A. BRENNAN.

Imbert, L., and Réal, P.: Fractures of the Lower Jaw (Iconographic des fractures du maxillaire inférieur). *Lyon chirurg.*, 1918, xv, 385.

The authors who direct the maxillofacial prosthetics at Marseilles have observed a very large number of fractures of the lower jaw. Their report is not confined to war fractures alone, but includes those observed in civil life. They divide mandibular fractures into four types:

1. Median, paramedian, or symphyseal fractures.
2. Fractures of the lateral region of the body of the bone.
3. Fractures of the region of the angle.
4. Fractures of the ascending branch.

Fractures of the median region include these varieties: (a) without loss of substance; (b) with little or medium loss of substance; (c) with large loss of substance; (d) double paramedian fractures.

Lateral fractures include those: (a) without loss of substance; (b) with small or medium loss of substance; (c) with extensive loss.

Fractures of the angle or of the ascending branch are of the same types.

The authors give a number of photographs of models of these various types of fractures. They have treated more than 1,000 cases of maxillary fractures, with a mortality of less than 1 per cent. W. A. BRENNAN.

Martin, H. H.: Treatment of Neuralgia of the Fifth Nerve by Injection of the Gasserian Ganglion. *J. Am. M. Ass.*, 1918, lxxi, 1970.

Injection of the gasserian ganglion through the foramen ovale for relief of trifacial neuralgia has passed the experimental stage, and it is the belief of the author it will supersede the extirpation operation. While the operation requires great skill because of the many important structures surrounding, with a careful study of the anatomy and frequent attempts on the cadaver, the technique can be mastered. There are no contra-indications to the operation.

The operation is done with the patient anæsthetized, and under surgical precautions. A needle 10 cm. long is used; after insertion, 5 to 10 minims of ½ per cent solution cocaine is injected, followed by 2 ccm. of 95 per cent alchol, half injected into the posterior root and half into the ganglion as the needle is slowly withdrawn. The author reports 7 cases. I. E. BISHKOW.

Dandy, W. E.: Extirpation of the Choroid Plexus of the Lateral Ventricles in Communicating Hydrocephalus. *Ann. Surg.*, Phila., 1918, lxviii, 569.

The author has done considerable experimental work on hydrocephalus, and as a result of his work he believes that this disease should no longer be classified as idiopathic, because its pathology and in a large part its etiology are definitely established. His studies on the subject include the paths for the circulation of the cerebrospinal fluid, the experimental production of hydrocephalus, the pathogenesis of many cases studied clinically by the phenolsulphonephthalein test, and the pathology of the various so-called types of hydrocephalus by postmortem examination.

The vast majority of cases of hydrocephalus are included in one of two groups: (1) communicating hydrocephalus; (2) obstructive hydrocephalus. The other types are rare. He has prepared the following classification based on the etiology and pathology of the disease.

1. Hydrocephalus due to diminished absorption of cerebrospinal fluid: (a) communicating hydrocephalus (due to adhesions in the subarachnoid space); (b) obstructive hydrocephalus, due to: (1) congenital atresias; (2) adhesions; (3) tumors; (c) external hydrocephalus.

2. Hydrocephalus due to increased production of cerebrospinal fluid: (a) acute hydrocephalus (increased fluid from inflammatory products in acute meningitis and in trauma); (b) communicating hy-

drocephalus (due to occlusion of the vena magna Galeni).

As a result of these studies he has arrived at the following conclusions:

1. Any treatment of hydrocephalus must be based upon the etiology and pathology of this disease.

2. Communicating hydrocephalus is caused by an obstruction in the subarachnoid space causing diminished absorption of cerebrospinal fluid.

3. This obstruction is probably nearly always due to adhesions following meningitis.

4. These adhesions close the cisternæ through which all cerebrospinal fluid is distributed to the subarachnoid space over the cerebral hemispheres.

5. Absorption is reduced to one-fourth or one-fifth of the normal, roughly corresponding to the volume of subarachnoid space which contains cerebrospinal fluid.

6. It is at present impossible to re-establish the cisternæ by surgical means.

7. By experiments it has been demonstrated that cerebrospinal fluid forms from the choroid plexus.

8. An operation is presented for the cure of this type of hydrocephalus by removal of the choroid plexus of both lateral ventricles. This removes, roughly, four-fifths of the total amount of fluid-forming structures. It is hoped the cerebrospinal fluid which forms from the choroid plexus can be absorbed in the small amount of subarachnoid space which remains in the third and fourth ventricles.

9. Choroid plexectomy is of value only in communicating hydrocephalus. Any treatment therefore presupposes an accurate diagnosis of the type of hydrocephalus. This is best made by the phenolsulphonephthalein test.

10. The operation has been performed upon four cases. One case is alive and apparently well ten months after the operation.

11. Sufficient time has not elapsed to speculate on the practical results of the operation.

12. The operation can be safely performed in moderately advanced cases of hydrocephalus.

The technique of the operation introduced by the author consists in making a small circular bone flap over the parietal eminence. The wound is made well posterior to the rolandic area and in a salient part of the occipital lobe. After ligating numerous vessels on the cortex by circumvection, the cortex is bloodlessly incised and this incision carried into the ventricle. The opening in the brain is maintained by an open nasal dilator, or when the ventricle is very large the brain wall must be elevated by a spatula which is inserted into the ventricle. It is necessary to remove all the cerebrospinal fluid in the ventricle to get a view of the choroid plexus; the brownish-red flocculent choroid plexus can then be easily followed from the foramen of Monro to the tip of the descending horn.

The choroid plexus is picked up in forceps at the foramen of Monro and the vessels ligated by a silver clip. A pledget of moist cotton is inserted into the foramen of Monro to prevent blood gravitating into the third ventricle. The plexus is then transected and gently stripped backward from its narrow attachment to the floor of the body of the ventricle. When the glomus is reached, the stripping from the body of the ventricle is stopped and the choroid plexus picked up at the tip of the descending horn. This part of the choroid plexus is also stripped backward to the glomus; the remaining attachment of the glomus is then liberated and the entire choroid plexus removed *in toto*. Bleeding from the denuded area of velum interpositum is slight and easily controlled by moist saline cotton pledgets. Special care must be taken to leave no bleeding points.

The collapse of the brain following evacuation of the ventricular fluid causes a remarkable infolding of the cerebral walls, the extent depending of course upon the size of the ventricle and thickness of the cortex. In advanced cases a tremendous cavity results, which is filled before closure with salt solution to restore the collapsed cerebral wall as nearly as possible to its natural convexity.

A remarkable exposure is obtained during the operation in the ventricle. One can see the third and opposite lateral ventricle and the septum lucidum which is frequently perforated in many places owing to pressure atrophy.

The opening in the cortex is closed with a series of interrupted fine silk sutures which are held by the delicate pia arachnoid membrane. The dura and scalp are carefully closed also with silk, special care being taken to prevent any subsequent leak of cerebrospinal fluid.

An interesting point in the paper was the use of the dye test as an aid to the diagnosis. One cubic centimeter of neutral phenolsulphonephthalein is introduced into either lateral ventricle; a lumbar puncture is done one-half hour later. If communication exists, the dye will by that time have appeared in the spinal fluid. If an obstruction exists in the ventricular system, the spinal fluid will remain colorless. The author warns against using the ordinary phenolsulphonephthalein solution used for kidney studies, as serious reaction will follow. A specially prepared solution must be used for this purpose.

G. W. HOCHREIN.

NECK

Bevan, A. D.: Acute Necrosis of the Thyroid Gland. *Surg. Clin. Chicago*, 1918, ii, 1089.

The author operated upon an unusual case of subacute infection of the thyroid gland, associated with symptoms very suggestive of a septic thrombus of a large vein. The patient was a male sixty years of age, who a month previous was taken acutely ill with chills and fever, and a severe sharp pain in the right side of the neck, just above the sternoclavicular articulation. He had recurring chills with high temperature. On examination a hard, wooden-like induration was found just above the sternoclavicular articulation, which was exquisitely tender, not fluc-

tuating, and seemed to be deeply situated. A diagnosis could not be made, so the area was explored under local anæsthesia. The mass was found to be an inflamed thyroid gland, embedded in an œdematous connective tissue capsule. There was no pus, and a cut section of the gland showed simply a round-celled infiltration.

The patient, however, did not make a recovery. The chills ceased, but his temperature continued. There was very little suppuration from the wound, which was kept open and packed with iodoform gauze. In the bottom of the wound a grayish-yellow necrotic-looking tissue could be seen. The whole area remained tender, although the pain disappeared largely from the neck. The chills commenced to recur with high temperature, and it was thought that there was present a septic thrombosis of some large vein in connection with the first diagnosis of an infection, and an extensive exploration under a general anæsthetic was decided upon.

A large yellowish necrotic mass, which moved with the trachea and which was embedded in an inflammatory capsule, was exposed. This mass was hard, and represented the right lobe of the thyroid gland. The left lobe of the gland was normal. There was no distinct isthmus. The necrotic right lobe was removed. Immediately following the operation the temperature dropped to normal and there were no more chills, showing that the chills and fever were not due to a septic thrombus in a large vein, but to the dead thyroid itself. A microscopic examination showed large areas of necrosis, the condition being very much like that of complete infarction. The patient at the time this report was made was going on to a rapid and complete recovery.

The author had never before seen a case of total necrosis of one of the lobes of the thyroid. He thinks that judging by the history of this case, the indication in a similar case in the future would be to make an immediate extirpation of the thyroid lobe, provided it is limited to but one lobe. Where the process involves both lobes, the better plan, the author thinks, would be to make a very wide exposure of the necrotic mass with drainage, in the hope that in the process of extraction of the necrotic tissue, some of the thyroid tissue might be retained, sufficient to prevent the condition of myxœdema.

E. C. Roos.

Schneider, E. H.: Syphilis of the Thyroid Gland; Report of a Case. *Calif. St. J. Med.*, 1918, xvi, 484.

Syphilis very rarely affects the thyroid. A case report and review of the literature are presented.

The patient, a woman of forty-eight, had had a small goiter for seventeen years. Three and one half months previous to examination, a small tumor 2 cm. in diameter appeared in the vicinity of the upper pole of the gland, and the goiter disappeared. Pressure on the trachea became marked. Brawny infiltration of the subcutaneous tissue prevented palpation of the thyroid. There was no cervical adenitis. A diagnosis of malignancy was made.

At operation, the soft tumor proved to be a putty-like softening of the muscles. The entire thyroid was a mass of fibrocartilaginous tissue, closely adherent to the thyroid and cricoid cartilages, and to the trachea. A small tumor 2 cm. in diameter lay in this tissue, and pressed against the trachea, causing angulation.

Histologic section showed interstitial proliferation, embryonic connective tissue and giant cells. The blood-vessels all showed obliterative arteritis. In places the thyroid tissue was obliterated by connective tissue overgrowth; other places showed normal acini. The whole specimen resembled an adenoma.

A blood Wassermann was four plus. A positive history was later obtained. Therapeutic relief was immediate.

J. R. Buchbinder.

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Hutchinson, W.: A Study of 450 Cases of Wounds of the Chest, with Special Reference to a New Method of Treatment for Infected Hæmothorax. *Canad. M. Ass. J.*, 1918, viii, 972.

The problems that presented themselves for solution in war surgery of the chest were how to deal with an open pneumothorax, infected hæmothorax, and foreign bodies in the lung. The problems have been solved.

In the author's series of 450 cases, 127 were produced by bullets, 50 by shrapnel balls, and 273 by pieces of shell. Wounds produced by bullets were least serious. More than half of the shell missiles, almost half of the shrapnel balls, and one-fifth of the bullets were retained. Infection occurred in nearly a quarter of the shell wounds in which the missile was not retained, and in almost half the cases in which it was retained. A relatively small per cent of shrapnel and bullet wounds were infected whether the missile was or was not retained.

Cases were observed in which a bullet passed entirely through the chest without producing any bleeding or leakage of air. Pneumohæmothorax was rarely observed. Pneumothorax may develop either from a valvular wound of the chest wall or lung. The treatment of the former is closure of the associated chest wound; that of the latter, providing an outlet through the chest wall for the air accumulating in the pleural cavity. The valvular leak from the lung leads to a positive intrapleural pressure.

Hæmothorax is usually from an injured lung. The

blood may be clotted or fluid. The fluid blood on being withdrawn will not clot. Serum and not blood may be found in the pleural cavity. The amount of hæmothorax fluid is increased by the inflammatory serum in infection. Infected blood is usually dark and thick and may be foul smelling. Streptococcus infection occurred in nearly one-third, gas bacillus in one-fourth, pneumococcus and mixed infection each in about one-fifth of the cases.

The lung may collapse from the import of a missile on the chest wall. Collapse of the lung occurs in the vicinity of a tear. This and blood clotting stops bleeding. A foreign body in the lung is quickly encapsulated by collapsed lung, blood-clot and inflammatory tissue. Very few lung abscesses develop.

Pleural exudate and pneumonia may develop on the side opposite the one injured. Purulent pericarditis occurred in 3 cases, aneurism of the great vessels in 2.

The important feature in diagnosis is the early recognition of infected hæmothorax. Conclusive proof of infection is furnished by a positive culture. Occasionally repeated aspirations and cultures are necessary. Infected hæmothorax must also be differentiated from consolidation and infection of the lung with a certain amount of fluid. In the former, pulse, temperature and respiration rise together; in the latter, usually the temperature alone is high.

The treatment of simple non-infectious hæmothorax is aspiration if the blood is clotted. Thoracotomy, evacuation of the clot, tight closure of the chest wall, and aspiration of air left in is recommended.

Open pneumothorax is treated by mechanical cleansing and closure. In infected hæmothorax resection of a rib under combined local and nitrous oxide and oxygen anæsthesia, manual removal of the clot, washing the cavity and swabbing with an antiseptic, and tight closure is the author's practice. Of 29 cases so treated, 16 remained closed, 13 were re-opened. After forty-eight hours the chest is aspirated. Foreign bodies the author believes should not be removed from the lung at the base hospital.

Of the 450 cases, 27 died, 12 of septicæmia, 6 of some form of pneumonia, with or without complications. Nineteen of the 27 were operated upon.

C. A. Hedblom.

Bérard, L., and Dunet, C.: Treatment of Purulent Postgrippal Pleurisies; Anterior Axillary Drainage and Intermittent Irrigation (Traitement des pleurésies purulentes post-grippales; drainage axillaire antérieur; irrigation discontinue). *Bull. Acad. de méd.*, Par., 1918, lxxx, 622.

The epidemic of grippe has shown a very considerable proportion of pleural complications. The authors only treat of true purulent pleurisies. These they treat by pleurotomy and drainage, which has given them excellent results.

The incision is made in the eighth or ninth space in front of the posterior axillary line. This serves only for the evacuation of pus and for the exploration of the pleural cavity by the finger in order to determine the lowest point for drainage. This pleural drainage at the lowest point is, according to the authors, the most important part of the operation. Pleuritic patients as a rule take the sitting or the half-sitting position and hence the lowest point will be anterior and at the level of the anterior costodiaphragmatic cul-de-sac. This is the point to drain. A second incision about 6 to 8 cm. long is made on the anterior axillary line. This large incision permits complete evacuation of the contents of the cul-de-sac, including the remnants of the pyogenous membrane which has lined the pleural cavity. It is also necessary to swab out the pleura by a mesh attached to a long forceps.

One to three Carrel tubes are introduced through the first pleurotomy incision and irrigation is commenced twenty-four hours after the operation and repeated every three hours.

This technique has given the authors very satisfactory results in 22 cases. There were only 2 deaths, due to concomitant bronchopneumonia. The recoveries were rapid and satisfactory.

W. A. Brennan.

Chevrier, L.: Study of Pleural Drainage; Treatment of Choice of Purulent Pleurisies (Étude sur de drainage de la plèvre; traitement de choix des pleurésies purulentes). *Presse méd.*, Par., 1919, xxvii, 9.

Chevrier says that there is only one logical and complete method of drainage of the pleura; yet textbooks recommend the poorest methods. He has experimentally tested several of the recommended methods on cadavers placed both in the vertical and decubitus positions and has studied the pleural retention in the different cases. Thus in resection of the sixth rib in the posterior axillary line there was a retention of 1,250 to 1,300 ccm. in the vertical position and 650 ccm. in decubitus; in the resection of the eighth rib in the scapular line there were retentions of about 200 and 300 ccm. respectively as before.

Usually the costodiaphragmatic cul-de-sac is considered the lowest part of the pleura, but Chevrier finds that the laterovertebral depression is lower and that if effective drainage is desired, the resection must be at the site of the bottom of this depression, at the angle of the ribs on the costal line. In a pathological pleura Chevrier shows that the bottom of the costodiaphragmatic cul-de-sac is raised up, but no method, radioscopic or other, permits the finding of the very lowest spot on the costal line in the bottom of a pathologic pleura. A special technique is therefore necessary.

The patient being in lateral decubitus, on the healthy side Chevrier makes an exploratory puncture in the costovertebral region after radioscopy. The incision is then made parallel to the rib immediately above the limit of positive puncture.

The muscles and the pleura are incised and the index finger, introduced into the pleural orifice, seeks the lowest point; a second incision, — a drainage thoractomy, — is made at the point determined by exploration. If this lowest point is near the first incision, it will suffice to enlarge it in the required direction.

Chevrier thinks that disinfection of the pleura by gas or by antiseptic vapors, together with drainage at the lowest point as indicated, is the best treatment of purulent pleurisies. In the majority of cases fistulæ are avoided, as well as the severe complicated operations which follow in their wake.

Chevrier insists that the pleura ought never to be drained on the axillary or scapular line, even if these are the classical methods for empyema. No pleurotomy gives efficient drainage except when made in the costal line at the lowest part of the depression. W. A. BRENNAN.

Moorhead, T. G.: Postpneumonic Empyema. *Med. Press*, 1918, cvi, 476.

The aphorism that all cases of unresolved pneumonia are cases of undiagnosed empyema contains a great deal of truth. To appreciate this is to avoid tragic results.

Two classes of empyema cases to which the above applies are the large extensive and the small interlobar or basal collections of pus. In the extensive type the history is that of an influenza followed by pneumonia. The temperature reaches normal or nearly so and after a few days goes up and remains up until proper treatment is instituted. Other symptoms, sweating, anorexia, dyspnœa, etc., are regarded as postinfluenzal. The physical signs may be very different from the classic signs of fluid. Adhesions may limit dullness to the lobar areas; breathing may be tubular and even amphoric. Physical signs must therefore be disregarded and exploratory needle puncture must be done in all cases with persistent symptoms. Every practitioner should carry an exploring needle and syringe in his bag.

The interlobar or basal type presents real difficulties in diagnosis. The pus often lies deep and is buried by adhesions. The symptoms are usually those already enumerated. The signs may be misleading. Where the pus lies between lung and diaphragm, the symptoms and signs may be referred to the abdomen. Needle exploration must be practiced, and once pus is found, it should be promptly evacuated. C. A. HEDBLOM.

Bierring, W. L., Luginbuhl, C. B., and Burt, C. W.: Streptococcus Pneumonia and Empyema; an Infection Affecting Eight Members of One Family, with Seven Deaths. *J. Am. M. Ass.*, 1918, lxxi, 1475.

The infection occuring in the members of this family was simultaneous with the epidemic report at Camp Dodge by Miller and Lusk. The family lived seventeen miles from camp.

The first seven of the eight cases died after an illness ranging around four to five days. The last two developed empyema. On one of these latter, the only one to survive of the family of eight, rib resection and drainage was done.

Autopsy was permitted in two cases. In both cases the findings were identical: bronchopneumonia with a seropurulent exudate, and a fibrinopurulent pericarditis. Both autopsies and the cultures from the lost case of empyema showed a hæmolytic streptococcus which was evidently the cause of the remainder of the cases.

Each case was characterized by sudden onset; there was no preceding history of measles or tonsillitis. J. R. BUCHBINDER.

Nims, C. H.: Empyema; Some Observations Made in the Fluoroscopic Study of a Series of 64 Cases. *Mil. Surgeon*, 1918, xliii, 538.

From a fluoroscopic study of empyema as it occurrred as a complication in pneumonia cases at an army camp, Nims observed that free collections of pus in the pleural cavity are usually preceded by small collections between the lobes. In many cases clear fluid could be aspirated from the free pleural cavity in the presence of pus between the lobes. He distinguishes three types, the incisural, the paravertebral, and the ordinary peripheral type.

In the incisural type the pus lies between the lobes. By rolling the patient slightly it could be observed in the flouroscope as a thin sheet between the lobes. The thinness of the sheet he thinks may explain frequent failure to aspirate pus on a second sitting after it has once been found.

In the paravertebral type the pus extends along the bodies of the vertebræ. In the peripheral type the pus occurred free in the pleural cavity.

Tabulating 64 cases on this basis, Nims found 43 classed as incisural, 5 as paravertebral. Many of the remaining 16 cases of the peripheral type the author believes were at first localized. Cases of streptococcus hæmolyticus infection he found much harder to interpret than the ordinary pneumococcus cases.

Patients are examined for diaphragm motility, heart displacement, and for collections of fluid by observations at various positions. In this way a shadow in the ordinary anteroposterior view may in the more lateral view resolve itself into a thin sheet of fluid in the incisura. C. A. HEDBLOM.

Achard, C.: Experimental Study of Mediastinal Emphysema (Étude experimentale de l'emphysème du médiastin). *Bull. Acad. de méd.*, Par., 1918, lxxx, 609.

The author's experimental study of mediastinal emphysema was made on dogs and verified on human cadavers. The cellular mediastinal tissue can be insufflated with air in different ways, either directly or indirectly at a distance. This diversity agrees with the diversity of pathological causes which determine mediastinal emphysema.

By direct insufflation of air into the mediastinum

of an anæsthetized dog, asphyxia and death soon followed. The gaseous bullæ were not confined to the mediastinum proper but spread to the œsophagus, trachea, and even to the pericardium; they continued upward, occupying the region of the neck, and downward to the posterior abdominal cellular tissues.

These findings were repeated and verified on the cadaver, as well as the findings obtained by insufflating the lung and pleura. They have shown the author that there is a continuity between the cellular tissue of the mediastinum and the cervical and retroperitoneal cellular tissues. A gaseous collection can pass from the one to the others. Mediastinal emphysema may therefore be considered as the middle stage of a more extensive emphysema, a cervico-thoraco-abdominal emphysema. It may be caused directly or indirectly, or even by aspiration following mechanical obstruction of the trachea associated with a peripheral wound. W. A. BRENNAN.

TRACHEA AND LUNGS

Sauerbruch: Progress in Lung Surgery (Fortschritte in der Chirurgie der Lungen). *Deutsche med. Wchnschr.*, 1918, xliv, 1320.

Sauerbruch says that recent researches into the conditions of circulation, exchanges, and respiration in the lung, as well as the pleural reflexes, supply certain data for further study in lung surgery. It is known that the pulmonary artery and vein supply nutriment to the lung tissues, that the bronchial artery and vein attend to the exchanges, that chemical irritations are responsible for variations in the size of the bronchial tubes, and that the lung itself and not simply the parietal epithelium of the pleura is responsible for the resorption of fluids and secretions. The surgeon should know and use this knowledge.

As regards lung traumatism, all shell wounds must be carefully observed and under certain conditions must be operated upon, even if there is no apparent external wound, as it may be assumed that shock, concussion or thoracic compression can cause corresponding injury of the delicate and sensitive lung tissues and gangrene may result. The large lung vessels can be ligated without danger. Special care must be given to lung ruptures. By hæmostasis and suture through an opened intercostal space, attention may be directed toward possible ruptures in the diaphragm with hernia. In such cases the stomach has been found in the pleural cavity.

Further points brought out by Sauerbruch are: (1) In transpleural injuries when the liver, spleen, etc., may be injured, suturing of these organs can be done through the diaphragm; (2) delayed operation can be done in pulmonary abscess, gangrene, and retained foreign bodies. The surest indications of trouble are given by sharp localized pain on pressure. Operation should be done under the differential pressure method, and such operation give 65 per cent favorable results.

In lung surgery bronchiectasis gives most unsatisfactory results. It should be operated upon the same as an abscess.

Regarding the surgical treatment of pulmonary tuberculosis, Sauerbruch speaks very favorably and hopefully. His experience now dates ten years back; there were 34 operated cases of that period. Fifty per cent of these cases were able to take up war duty. Operations upon patients with cavernous lesions promise good results when the cavities are enclosed in a thick mass of callus, if the other lung is not actively diseased. The operative technique aims at the establishment of artificial pneumothorax, and in the case of adhesions, of resection of the ribs over the compressed part of the lung, even by resection of the first to the eleventh ribs. Sauerbruch reports several cases operated upon two to six years ago, and now living and able to work. Of 297 tuberculosis cases operated upon, 122, or 41 per cent, were healed; 78, or 28 per cent, died.

W. A. BRENNAN.

PHARYNX AND ŒSOPHAGUS

Hubbard, T.: The Treatment of Lye Strictures of the Œsophagus. *J. Am. M. Ass.*, 1918, lxxi, 1706.

As a point in the prophylaxis of lye burns, the author mentions the carelessness with which commercial lye is handled and dispensed to the housewife without a poison label.

Burns in the mouth and throat are usually not serious because of the dilution by the mouth secretions. Similarly the stomach rarely suffers because the acid gastric juice neutralizes the lye as fast as it is swallowed. The vomiting which nearly always occurs tends to help the œsophageal burn by lavage of its mucosa with gastric juice.

Two fatal cases are mentioned, the first in a boy of twelve. Death from inanition occurred following a gastrostomy. The second case was a five-year-old child burned six months previously. The cause of death was the same. Two other cases in which successful results following Sippy's method occurred, are mentioned.

Sippy's method is commended for its safety and precision. It is necessary to know the measurements, and to be certain that the wire guide goes into the stomach. Too large an olive must not be used, else a band of stricture tissue will be pinched on extraction.

The successful dilatation of these strictures makes possible but does not insure a cure. The patients are obedient while starvation threatens, but are prone to neglect subsequent treatments. The maximum dilatation should be decided upon and held there. It should be 26 in a three-year-old child, and 35 to 40 in an adult. To determine that the maximum has been reached, bismuth studies are made to determine the amount of dilatation above the stricture.

The author has had little experience with the

forceful dilatation of stricture, but feels that it is a dangerous procedure with anything but a single stricture of a limited area.

The maximum dilatation should be held by passing a specially adapted olive bulb at frequent intervals. In gastrostomized cases the stomach tube should be retained even after dilatation is well advanced, to give confidence to the patient. The work is tedious and slow and much depends upon the willingness and co-operation of the patient.

J. R. BUCHBINDER.

Kotzaroff, A.: Œsophageal Imperforation (Imperforation de l'oesophage). *Ann. de gynéc. et d'obst.*, Par., 1918, lxxii, 203.

The child in the author's case, with birth and antecedents normal, showed severe cyanosis with symptoms suggesting a hypertrophied thymus or retrosternal goiter. The child did not feed and rejected food. After a few days the thymus was removed. Conditions did not improve and the child died on the ninth day after birth. Autopsy showed that there was an imperforate œsophagus, occlusion being due to a ligament uniting the trachea and œsophagus, which was situated slightly above the bifurcation of the trachea. There was complete arrest of development. The condition is illustrated by a number of photographs.

This type of congenital malformation of the digestive tract is rare, only a few cases having been reported. Embryologically the œsophagus develops from the anterior part of the endoderm, together with the trachea. Hence concomitant malformations of trachea and œsophagus are usual. It has been explained that congenital anomalies of the œsophagus occur by pressure of the large vessels, especially the subclavicular. While such an hypothesis might explain several of the cases, the author cannot accept it as universally true. Sometimes the œsophagus alone fails to develop and sometimes both trachea and œsophagus. The author does not offer an explanation, unless it be due to some vascular or nervous failure by which the organs remain in a rudimentary condition.

The types of anomalies which may present clinically are: (1) congenital stenosis; (2) imperforation of the œsophagus; (3) closure of one end or complete absence of the œsophagus. The latter two types have usually a fatal ending.

Diagnosis is easy when the condition is suspected. The symptoms are difficulty of deglutition, immediate or very rapid rejection of nourishment, and signs of suffocation. Vomiting is not an indication. The condition may be verified by catheterization or X-ray.

The only treatment is surgical, the usual method being a gastrostomy. Death followed in 9 cases in which this was done. This was not due to the operation, nor to its technical difficulties. The infant dies from inanition or pneumonia. According to Witzel, jejunostomy gives good results. When the anomaly exists above the cardia, von Hacker's operation is indicated and the author refers to a case in which it was successful.

W. A. BRENNAN.

SURGERY OF THE ABDOMEN

GASTRO-INTESTINAL TRACT

Crohn, B. B.: Studies in Fractional Estimation of Stomach Contents. *Am. J. M. Sc.*, 1918, clvi, 656.

The method of fractional estimation of stomach contents has been used previously as a means of studying the direct effect of alkalies upon gastric digestion. The same method is used by Crohn in the following experiments, in order to determine the results following therapeutic administration of HCl and the best method for its administration.

A patient suffering from pernicious anæmia or achylia gastrica was given 40 minims of dilute HCl and the stomach emptied by aspiration. Directly after administration the total acid was 40 per cent and the free acid 32 per cent. Specimens withdrawn every five minutes showed a rapidly diminishing acid titer until no trace was left in twenty-five minutes.

HCl administered fifteen minutes before the test meal of oatmeal gruel resulted in a free acidity of 20 per cent and total acidity of 24 per cent. The acid had practically disappeared in fifteen minutes, exerting no influence on the normal acid secretion.

When the HCl was administered with the test meal, a slight increase in acidity was noticed only during the first half hour.

Administration of 20 minims fifteen minutes after the test meal resulted in complete failure to relieve anacidity. When this dose was doubled and given under the same conditions, the increase in acidity was noticed for the first half hour.

No effect was seen when 5 minims HCl was administered one and one-half hours after the test meal. However, when 25 minims were given three-quarters of an hour after the test gruel was ingested, a slight acidity was noticed to the end of digestion.

Ten minims of dilute HCl administered every half hour produced a definite increase in total acidity throughout the digestive cycle, though free acid was not produced at any time.

When 10 minims of HCl were administered every fifteen minutes during digestion, an acid titer of 68 per cent was maintained. The motility of the stomach was unchanged and emptying took place in two and one-quarter hours.

One striking fact in these experiments is the rapid disappearance of the acid. Another is that the titer, which results upon the introduction of acid, is not maintained but rapidly neutralized. The pri-

mary agency in neutralization is a secretion of watery gastric juice containing no acid ions. The second is a secretion of alkaline mucus. The process of dilution and neutralization ceases upon the disappearance of the last trace of free acid. At no time is there a secondary rise of acid.

The method of administering repeated small doses of acid is most satisfactory. For general work the following conclusions might be offered:

1. The customary method of giving a single dose of HCl is usually insufficient to relieve abnormal conditions.

2. Small single doses (5 to 20 mm. dilute HCl) fail completely. Larger doses (25 to 40 mm.) give temporary results.

3. Administering the doses every half hour or every fifteen minutes produces a far more desirable effect.

4. Giving acid before a meal has no advantages. The best results are seen when given during the early part of a digestive cycle.

5. The effect is purely a local chemical one. A resulting physiological stimulation of the mucosa was never demonstrated from these experiments.

F. P. HAMMOND

Vulliet: Vicious Circle After Gastro-Enterostomy and the Means of Remedying It (Le "circulus vitiosus" après la gastro-entérostomie et les moyens d'y remédier). *Rev. méd. de la Suisse Rom.*, 1918, xxxviii, 673.

Vulliet says that the vicious circle after gastro-enterostomy, although it has disappeared to a great extent in the newer techniques, is present often enough to give concern to the surgeon. When it occurs, there are only two means of re-establishing gastric evacuation, ie., an entero-anastomosis, using the afferent (gastroduodenal) loop; or a new anastomosis preferably in the anterior region of the stomach. In 4 patients in which the author carried out this secondary anterior gastro-enterostomy there were 3 successful results and 1 failure.

The mobilization of the left part of the duodenum as described by Schumacher is unquestionably of real service in gastro-intestinal surgery. With regard especially to vicious circle, it makes practicable an entero-anastomosis which prevents occlusion in the majority of cases. Vulliet thinks that, save in exceptional cases, without mobilization of the left duodenal loop no secondary entero-anastomosis is possible after a correct posterior retrocolic gastro-enterostomy.

However, mobilization of the left duodenal loop, although easy enough in the cadaver, offers serious clinical risks. Vulliet thinks it would be an exaggeration to say that this is the only method of conquering the vicious circle. A new well-placed simple gastro-enterostomy serves well, and it has the further advantage that it does not, like mobilization of the duodenum, call for exceptional surgical skill, but is within the scope of the average surgeon.

W. A. BRENNAN.

Fisher, W. H.: Arteriomesenteric Ileus of Duodenojejunal Flexure. *Ann. Surg.*, Phila., 1918, lxviii, 582.

Fisher has reviewed the literature on the subject of arteriomesenteric ileus of duodenojejunal flexure and found that it abounds with reports of cases with the title of gastromesenteric ileus, acute dilatation of stomach, acute gastroduodenal dilatation, giant duodenum, acute and chronic duodenal dilatation. All these are the effects of the condition named in the title of this paper and belong to and are a part of the symptoms complex, and as such should be discarded, having no claim *per se* in the nomenclature of surgical entities. As the result of his study he has come to the following conclusions:

1. Arteriomesenteric ileus at the duodenojejunal flexure is a true surgical entity.

2. The anatomical features are predisposing factors to occlusion.

3. It has three clinical types: (a) organic arteriomesenteric ileus; (b) acute arteriomesenteric ileus; (c) chronic arteriomesenteric ileus.

4. Each type has its specific causative factors: (a) occlusion due to new-growths, infective peritonitis, strangulated hernia, cicatricial contraction, enteroliths, etc.; (b) splanchnic innervation with duodenal tension and resulting loss of propulsive power; (c) compression by mesentery and its vessels or traction from visceroptosis acting either separately or jointly.

5. Surgical intervention is indicated and with certain exceptions duodenojejunostomy is the operation of choice.

To illustrate his point he cites the following case:

The patient, a male, aged twenty-one, had had stomach disturbances since childhood. There was a burning sensation in the epigastrium associated with exercise. Bananas were the only food that disagreed with him, producing indigestion with distention. There was always a tendency to constipation, and when not relieved, vomiting associated with it. There was no gastric pain in the early course of the disease. One day on assuming the upright position, after working in a stooping posture, he was seized with epigastric pain radiating to the back and right of the abdomen. The pain was continuous, more or less severe, and compelled him to cease work.

Two months later he was operated upon. A right rectus incision revealed a dilated duodenum. The duodenojejunal fossa was entirely obliterated by the dilated duodenum and surrounding retractive jejunal peritonitis. The jejunum, instead of passing to the left and downward, was retracted upward and to the right, firmly adherent to the abdominal vessels and completely flattened against the spine. Its course then was downward and to the right.

After careful dissection the bowel was freed from its attachments, the mesentery unrolled, allowing the bowel to pass to the left. The raw surfaces were closed over and a retaining suture was placed on the jejunum to prevent further rotation to the right.

The patient was elevated in bed and was kept on his left side for three days. Convalescence was uninterrupted. The keynote of success in the operative technique was the careful dissection to relieve the double angulation and the proper juxtaposition of peritoneum over the vessels, thereby avoiding a future retraction of the bowel. Up to the time of this report, the patient had had no recurrence of the trouble. G. W. HOCHREIN.

Eisberg, H. B., and Draper, J. W.: Intestinal Obstruction; Continued Studies. *J. Am. M. Ass.*, 1918, lxxi, 1634.

Additional evidence is accumulating that death caused by intestinal obstruction is due to toxins originating in the epithelium of the duodenum and its appendages. The authors have divided their study of this problem into three phases: transplantation, proteose isolation, and obstruction ratio.

The entire duodenum with its outbuds, the pancreas, and liver are separated from the alimentary canal. The pyloric end of the segment and the stomach are occluded, the duodenum is anastomosed to the ileojejunum, and posterior gastrojejunostomy is performed. This constitutes the primary operation. From two to three weeks after, obstruction by section and infolding 35 cm. aboral to the gastrojejunostomy was produced. This corresponds in position to the duodenojejunal obstruction. As a result the dogs operated upon lived seventeen days, or three days longer than after obstruction in any part of the small intestine except the sphincter. Moreover, duodenal transplantation prevented the occurrence of classical symptoms of duodenal obstruction. The conclusion is that the duodenum with its embryologic outbuds furnishes the cause of death.

Experiments in the injection of proteose resulted in death. However, when fluid was obtained from blood loops, no reconstruction having been done, intoxication was produced. If, however, end-to-end anastomosis was used, the symptoms were either very light or absent. Sweet explains that the toxic agent was formed in the duodenum but excreted into the occluded loop. Animals with jejunal loops have lived indefinitely, while those with duodenal loops died.

The belief that bacteria is the sole cause of death in intestinal obstruction is contradicted by the fact that the duodenum is virtually bacteria free, and also that closed segments of the terminal ileum and colon, regions where bacteria abound, are not incompatible with long life. Observers agree that the most active manifestations of the toxin of intestinal obstruction, which is believed to be of the same nature as the endocrine secretions, occur during duodenal obstruction. A point in the second portion of the duodenum, at which acute obstruction causes death more rapidly than elsewhere in the intestine, is known as the true lethal line. Oral or aboral to this line there is a proportionate decrease of obstructive toxicity.

The exact ratio is not yet determined but the fact remains that there is a constant mathematical ratio.

F. P. HAMMOND.

Grey, E. G.: Studies on the Aseptic End-to-End Anastomosis of the Intestine. *Bull. Johns Hopkins Hosp.*, 1918, xxix, 267.

For many years attempts have been made by surgeons to devise practical methods for the end-to-end anastomosis of the intestine which would minimize the amount of soiling of the suture line and of the neighboring abdominal structures. As a result, a number of interesting suggestions have been made by various authors. The method to which the best clinical results have been ascribed, however, have all made use of instruments, all or some of which had to be extricated from the line of closure in the concluding steps of the operation. Such procedures, of course, either leave the lumen temporarily occluded with crushed bowel, or expose the line of anastomosis to soiling from within.

A short time back Halsted suggested the bulkhead suture for this purpose, a procedure which was altogether novel at the time, and which afforded certain distinct advantages over the methods then in use. He demonstrated on dogs that a successful end-to-end anastomosis of the intestine might be carried out in an aseptic manner, "except as contamination may occur from stitches which of necessity or by accident have been carried into the lumen of the intestine." Until some substitute is discovered for the needle and thread, it will be necessary always to reckon with this source of contamination. The fact, however, that with care the operator may prevent most or all of the stitches from entering the lumen greatly lessens the importance of this factor.

The experiences presented in this report were encountered in the course of some experiments with this method conducted on dogs. Although the procedure described here differs from that used by Halsted in certain details, it nevertheless makes use of the characteristic feature of the bulkhead suture, namely, the invagination of the closed ends of the intestine with subsequent cauterization of them to re-establish the lumen. The wire-release ligature and the fibrin bolus have been substituted for the cones of paper.

The absence of any recorded microscopical examination of intestinal anastomoses made with the bulkhead suture suggested to the author the desirability of comparing the rate of healing in such anastomoses with that occurring in the simple, open, end-to-end unions of the bowel. Such a study, it was thought, would also afford some opportunity to observe the effects of the use of the cautery on the rate of healing in intestinal wounds.

The first step in the operation is identical with that described by Halsted. At the point of election the peritoneal and muscular coats are divided and stripped back on the submucosa far enough to enable the operator to place two ligatures around the gut.

The intervening submucosa and mucosa are then divided with the cautery.

To prepare the bulkhead two or three of the fibrin blocks (depending upon the size of the lumen and the dimensions of the blocks) are held together and pressed against the cauterized end of the bowel invaginating it to the desired extent.

It saves time in the subsequent steps of the operation when the blocks are invaginated so that their exposed ends lie a few millimeters within the folded margins of the bowel. The wire-release ligature is now tied with force a short distance from the end of the intestine, binding the gut to the enclosed bolus. It is so placed that the free end of the wire is directed away from the line of anastomosis. After both pieces of intestine have been prepared in this way, the folded ends are cut away with the cautery knife close to the ligatures, as in the Halsted method.

As the vessels have not been disturbed in these steps, the blood supply remains perfect up to the site of each ligature. Exactly at this line the vessels entering the gut are ligated. The larger vessels distal to this point are then also secured with circumsection. The end-to-end anastomosis now remains to be made with the continuous mattress suture. An additional mattress stitch placed about each release wire is drawn tight only when the latter is removed. The wires in the course of the anastomosis find their points of exit without interfering with the approximation of the bowel ends.

The ligature about each bulkhead having been released by the withdrawal of the wire, the line of union is gently rolled in a piece of gauze to loosen the boli. With slight pressure the invagination bulkheads are liberated and the lumen of the bowel is re-established.

The operation was performed as described on 37 dogs, 34 times on the small intestine, and 3 times on the colon. The specimens were removed at varying postoperative periods ranging from forty-eight hours to 106 days. In the series of 37 animals there were two deaths directly attributable to the work on the intestines. Postmortem examination in both instances disclosed a general peritonitis, the origin of which could be traced to a perforation in the line of anastomosis. Each of these animals, however, was quite small, with a bowel proportionately narrow in its diameter. From these observations the author reaches the following conclusions:

A new wire-release ligature and a bolus of fibrin which is easily sterilized have been substituted for the paper cones. Specimens were secured following the operation at intervals varying from a few hours to 106 days. A study of the process of healing shows the following points:

The process of repair in the bulkhead suture may, under favorable circumstances, lag but little behind that noted in the plain end-to-end anastomosis. On the average, however, the healing is a little slower in the former.

A large in-turn may not materially lengthen the period of regeneration, provided that the two inverted bowel ends remain about equal in size. The size of the in-turn remaining after several weeks varies greatly from specimen to specimen. Frequently very little inverted bowel is found at this time.

As a rule, there is a considerable delay in the repair of the mucosa when the two parts of the in-turn are of unequal length owing to poor approximation or to an inequality in the necrosis on the two sides. This, however, does not appear to affect the function of the intestine.

No striking difference was noted in the rate of repair between bulkhead sutures in which the cautery had been used and those in which the knife had been substituted for it.

Stitches which puncture the epithelium usually delay the healing of the latter. Frequently such sutures carry a prolongation of the epithelium down into the deeper layers. Such adenoma-like prolongations may weaken the line of union where only one layer of stitches has been inserted.

GEORGE E. BEILBY.

Pauchet, V.: Tumors of the Large Intestine (Tumeurs du gros intestin). *Presse méd.*, Par., 1918, xxvi, 543.

Pauchet says that the efficacy of surgery in cancer of the large intestine depends upon four factors:

1. The relative benignity of the colic cancer.
2. The large mobilization of the intestine by coloparietal or colo-omental exposure, which allows a considerable length of the intestine to be removed and subsequent reparation made without difficulty.
3. Preservation of the vascularization of the intestine by sparing the marginal artery for its nourishment according to the Hartmann technique.
4. Confining the excision of lymphatic vessels and ganglia to what is absolutely essential and belonging to the segment of intestine affected, following Cunéo's method. Usually the first series of ganglia alone is cancerous and calls for removal. The wide ganglionic resection which is called for in cancer of other regions, such as the breast, is not necessary in a radical operation for cancer of the large intestine.

The author gives the technique of operation according as the tumor is situated in the descending or transverse colon, in the sigmoid, or in the cæcal region of the colon. The various steps are illustrated.

W. A. BRENNAN.

Bosch Arana, G.: Surgical Treatment of Chronic Constipation in Pericolitis and Ileopelvic Megacolon (Tratamiento quarurgíco de la constipación cronica en la pericolitis y el megacolon ileo-pelviano). *Rev. Asoc. méd. argent.*, Buenos Aires, 1918, xxix, 437.

The author places particular importance on some irritative or infectious process giving origin to pericolic or mesenteric membranes, when they are not of congenital nature, which they may be. The particular casual agent of the irritation varies according

to the case; it may be intestinal reaction or it may arise through the blood, as in syphilis, for example.

In chronic constipation due to pericolitis medical treatment should first be instituted, varying the therapeutics according to clinical symptoms. When this fails, surgery is resorted to. Sectioning the membraneous constrictive bands corrects the intestinal kinks, and peritonization of the bleeding surface, when such is feasible, results most satisfactorily. Omentum is used for the peritonization. The author does not employ oily substances to avoid formation of new adhesions, but gives strict care to the drying of the cavity, the least portion of blood remaining in the abdomen being carefully swabbed, and also seeing that the sectioned membranes no longer bleed. Moreover, care must be taken that the freed intestine is placed in the proper position. Treatment must not end with operation, as such patients in order to be radically cured require adequate supplementary medical supervision.

In one case the author was obliged to perform a total colectomy and from the results in this case he concludes that the colon is not essential to the life of the patient, and that in some cases this operation is very favorable in patients with chronic constipation.

With regard to ileopelvic megacolon the author gives clinical histories of 8 cases treated operatively. Generally it is easy to relieve such patients at their first or second attack, but for various reasons they fail to observe the regime imposed upon them and the condition recurs in an aggravated form.

The author therefore thinks that it is the surgeon's duty to perform a radical operation in the first instance, removing the entire megacolon. The author's technique consists in resecting a portion of the megacolon, followed by an end-to-end anastomosis and peritonization. The technique covers fifteen separate stages, each of which is detailed, and many illustrated. The author is particularly careful in exteriorizing the megacolon until the colon is seen to be healthy, without paying any regard to the future anastomosis.

In making the anastomosis the posterior seroserous suturing is first done with No. o catgut. The posterior seromuscular, posterior mucomucosa, anterior seromuscular, anterior seroserosa suturings then follow in the order named, making three superimposed suturings thus: in the posterior semi-circumference: (1) seroserosa; (2) seromuscular; (3) mucomucosal; in the anterior semi-circumference: (1) a common perforating suture; (2) seromuscular; and (3) seroserosa. This gives a firm hæmostatic closure to the anastomosis.

The conclusions based on the author's experience are:

1. The etiology, pathogenesis, and pathological anatomy indicate colectomy as the treatment of acquired ileopelvic megacolon; and this operation is best calculated to cure such patients.

2. The technique described and followed by the author has given excellent results. This technique is difficult, and requires conscientious, detailed, and skillful work.

3. In patients whose livelihood depends on hard labor and who cannot provide themselves with the proper hygienic care, colectomy is peremptorily indicated; but in the case of well-to-do persons a rigorous medical treatment will answer. When the fæcal impactions are repeated despite medical care and dietetic restrictions, colectomy should be done irrespective of the patient's social status.

The mortality in the author's cases was 12 per cent (1 death in 8 cases). The other 7 patients have been followed for more than a year; all have benefited and show no new complications.

W. A. BRENNAN.

LIVER, PANCREAS, AND SPLEEN

Whipple, A. O.: History Analysis Applied to Surgical Diseases of the Biliary Tract and Pancreas. *Ann. Surg.*, Phila., 1918, lxviii, 471.

The author has drawn up and presents an outline of history for the study of surgical diseases of the biliary tract and pancreas. This includes in great detail the anamnesis, the physical examination, the laboratory and clinical findings, the discussion of the pre-operative diagnosis, the pathological reports, the notes on the postoperative course and complications, the discussion of the case by the operator and house surgeon in case of death, the autopsy report, an analysis of the cause or causes of death, and finally, an accurate follow-up record.

Present methods of record keeping are incomplete and inaccurate. He emphasizes the necessity of unit history in which accurate ante and posthospital as well as hospitalization records are accurately made. Only from such records can clinical research be conducted.

From such a study of 400 surgical cases of diseases of the biliary tract the author concludes:

1. Aside from the typical character and radiation of the pain in biliary colic, the most constant symptoms of gall-bladder disease are those of "indigestion," i. e., a feeling of epigastric distress, or a distended or "bloated" feeling in the epigastrium or left upper quadrant, and the belching of gas. This group of symptoms occurred in 78 per cent of the cases.

2. These symptoms are of much longer duration than is usually appreciated, especially in women. This places the onset of the cholecystitis or cholelithiasis in an earlier decade than is usually given; certainly in women the disease usually begins in the third or the fourth decade, during the active child-bearing period.

3. Cholelithiasis was present five times more frequently in women than in men in this series. Eighty per cent of these women gave a history of one or more pregnancies. Thirty-two per cent of the parous women gave the history that their first attacks of biliary colic occurred during the later months of pregnancy. The fact that many women

gave the history of onset of symptoms during the menopause taken in conjunction with the facts relating to pregnancy emphasizes the importance of a hypercholesteræmia as a causative factor in gall-stone disease.

4. Jaundice was not a prominent symptom or physical sign in this series, only 35 per cent giving the history of jaundice and only 20 per cent showing jaundice in skin or sclera at the time of examination.

5. Involvement of the pancreas, as observed at the time of operation in the form of an enlarged, indurated organ, or the so-called pancreatic lymphangitis of Arnsperger, a localized induration of the head of the pancreas about the common duct, was present in 36 per cent of the cases. This was found not only in the common duct stone cases, but in many cases in which the gall-bladder did not appear markedly diseased, but where the lymph-glands draining the gall-bladder and ducts were enlarged and in many cases having the so-called "strawberry" gall-bladder with or without stones. Such cases gave much better results with cholecystectomy and choledochostomy than those treated by cholecystostomy. In the latter subjective symptoms of fat and proteid indigestion recurred or persisted much more frequently.

In cases of chronic pancreatitis, prolonged drainage of the common duct with cholecystectomy gave better results both from the standpoint of immediate operative risk and subsequent relief of symptoms than in the cases where attempts were made to dilate the strictured duct or maintain a passage into the duodenum by means of a catheter drain.

6. A hepatitis, either in the form of a localized or contiguous inflammation about the gall-bladder and ducts, or a general involvement, a true biliary cirrhosis, was found on gross examination of the liver in 21 per cent of the cases of cholecystitis. The lesion was found present on microscopical examination in all cases from which a section of the liver was removed. This corroborates the observations of Evarts A. Graham, of Chicago. In two cases the liver was enlarged, sections showed a marked cirrhosis, both biliary and portal, in one case ascites was present, and in both cases followed carefully after operation, the liver decreased in size and the symptoms of cirrhosis disappeared following cholecystectomy and choledochostomy. In both these cases there was a marked associated pancreatic lymphangitis causing common duct obstructions.

7. Postoperative pneumonitis proved to be the most frequent major complication.

8. In the common duct obstruction cases hæmorrhage during and following the operation proved the most serious complication. Jaundice was not necessarily present, for in two cases of long-standing biliary fistula the patients died of uncontrollable oozing from the wound.

The one measure used both as a pre-operative and postoperative form of treatment in these cases, that proved to be unquestionably effective and in several cases life saving, was the intravenous infusion of a 0.2 per cent calcium lactate in normal salt solution. This was given in a 200 to 500 ccm. quantity. By coagulation time tests it lowered the clotting time by one-third to one-half in the eight cases in which it was tried. In the deeply jaundiced patients, where it was used four to six hours before operation, no persistent bleeding occurred; in the cases where it was given after oozing from the wound had become pronounced, the bleeding was invariably stopped. As a means of treating hæmorrhage it proved very much more efficacious than the administration of bile, serum treatment, or blood transfusion.

9. Comparison of the results following operations for gall-stone disease with those for gastric and duodenal ulcer and so-called chronic appendicitis is very much in favor of gall-bladder surgery. In these diseases since the interval result system has been in operation at the Presbyterian Hospital, a period of two years, one finds complete success, i. e., a scar without hernia, entire relief of symptoms, and a return of the patient to economic efficiency, in 73 per cent of gall-stone disease, in 54 per cent of gastric ulcer, in 72 per cent of duodenal ulcer, and in 54 per cent of so-called chronic appendicitis.

Sadlier, J. E.: Report of a Case of Pancreatic Cyst in Association with Tubercular Kidney and Intestinal Complications. *Am. J. Obst.*, N. Y., 1918, lxxviii, 773.

The patient, aged thirty-nine, was first seen on June 24, 1917, suffering from acute intestinal obstruction. The obstruction, which was of twenty-four hours' duration, had come on suddenly and was evidently very extreme. Two years previously the uterus and adnexa, as well as the appendix, had been removed. On June 25, the abdominal symptoms suddenly ceased. The patient had a large evacuation of fæcal matter and gas from the bowels. There was an evident mass in the region of the left kidney.

On July 2, the left kidney was removed by operation. The operation was made extremely difficult by reason of the fact that the tuberculous process in the kidney had ruptured through its capsule and a perinephritis, tuberculous in character, was much in evidence. A few days subsequent to the operation a fæcal fistula became established through the kidney wound. The patient rallied nicely from the operation and in spite of the fæcal discharge, she improved to a certain degree, although not to the point desired. She was discharged from the hosptial on August 18, with the fæcal fistula still in evidence.

Prior to discharge there was noted a small tumor above the umbilicus and distinctly to the left of the median line, reaching over in the neighborhood of the splenic flexure of the colon. She returned on November 3 in scarcely better condition than when she left. At this time it was noticed that the tumor in the left upper quadrant was decidedly larger.

easily palpated, and could readily be seen, bulging that portion of the abdomen.

An upper left rectus incision was made. Upon exposing the viscera, there was an attachment of the ileum to about the center of the transverse colon, which, when liberated, disclosed that there was a fæcal communication between this loop of the ileum and the transverse colon. The opening in both ileum and colon was sutured. The fistulous opening in the colon was also closed. The globular tumor mass in the upper abdomen proved to be a pancreatic cyst about the size of a large grapefruit. It had a good-sized base, and after careful palpation of its outline and attachments, it was deemed impossible to do otherwise than to drain it.

After careful suture of the pancreatic cyst wall to the parietal peritoneum, the cyst was aspirated and incised, liberating about a pint of light straw-colored fluid, which upon chemical analysis proved to be pancreatic fluid. The cavity of the tumor was packed with gauze. Rubber tissue drains, arranged to come out of the lower end of the wound, were applied in the abdomen to the location of the intestinal suture. The patient rallied nicely from the operation, but for about two weeks there was a very extensive drainage from the cyst which was very excoriating to the surrounding surface. The drainage gradually lessened, and finally, as the wound healed, it ceased altogether. The patient's condition steadily improved and at the present time all evidence of defective metabolism is absent. She has gained in weight very materially and is now strong and vigorous. EDWARD L. CORNELL.

MISCELLANEOUS

Saviozzi, V.: Penetrating Gunshot Abdominal Wounds (Ferite d'arma da fuoco penetranti dell' addome). *Clin. chir.*, Milano, 1917-1918, xxv, 486.

The author reviews the history of abdominal war wounds since the War of Secession down to the present war. His article is accompanied by a number of short case reports and illustrative charts. His survey of the subject brings him to the conclusion that the only rational treatment of this class of injuries is laparotomy done as early as possible. It should be done either in the mobile surgical ambulance or in special hospitals not distant more than 8 to 15 kilometers from the firing line and protected against artillery.

The cases observed were 101 in number, all penetrating abdominal wounds, 30 of which were operated upon and 71 not operated upon. In the operated cases the mortality was 70 per cent and in the non-operated 64.62 per cent.

At first glance the figures seem to be in favor of abstention; but analysis of the cases shows that in operations done within the first six hours, the mortality was 37.50 as against 90 per cent in cases operated upon after that period; and that in lesions of the gastro-intestinal tube the mortality was 84.21 per cent as against 80.77 per cent in non-operated cases. Postmortems however have shown that spontaneous recoveries from true gastro-intestinal lesions are rare; that some cases might have been saved by operation; and that in the operated cases failure was due either to the fact that the lesion was beyond surgical aid or that operation was carried out too late.

The findings show that early operation is especially called for in wounds of the umbilical and hypogastric regions when such injuries are amenable to surgery. Five of the operated cases would undoubtedly have died if not operated upon. Cases with spontaneous recovery are almost always injuries in the flanks and in the inguinal regions. The non-operated cases with fatal termination almost all belong to the umbilical and hypogastric zones.

For bladder wounds the author recommends cystostomy with repair of the bladder.

W. A. BRENNAN.

Pfahler, G. E.: Importance of a Complete Roentgen Study of the Gastro-Intestinal Tract and Gall-Bladder in All Obscure Abdominal Cases. *J. Am. M. Ass.*, 1918, lxxi, 1951.

Since roentgen studies of the gastro-intestinal tract are generally limited to obscure cases, they should be thorough and complete if positive value is to be obtained from them. They should include the investigation of the gall-bladder region for gall-stones, enlargement, and adhesions; a study of the stomach to prove that it is either normal or abnormal, and if abnormal, in what respect it is abnormal; a study of the duodenum; a study of the head of the pancreas; a study of the course of the food through the small bowel; a study of the appendix and the appendiceal region; a study of the colon; and very often it is advisable to make a study of the spinal column and of the urinary tract. The greatest stress should be laid on the organ under suspicion or on the organ which, during the course of the examination, suggests some pathologic condition.

The author describes the examination he usually makes and elaborates upon the findings thus obtained relative to the stomach, pylorus, duodenum, gall-bladder, small bowel, appendiceal and cæcal regions. The important diagnostic points with reference to the appendix and chronic appendicitis are dwelt on at some length. A complete examination may disclose multiple lesions whose combined symptomatology may render the case obscure; treatment covering all of them may be essential to effect a cure.

The author draws the following conclusions:

1. A complete roentgen study should be made in all obscure abdominal cases.

2. Such a study should determine each organ to be either normal or abnormal, and if abnormal, the nature of this abnormality should be carefully described.

3. The diagnosis of carcinoma, if present, may practically always be made.

4. The absence of carcinoma may, in most instances, be proved.

5. Gastric ulcer may be recognized in about 90 per cent of the cases.

6. Duodenal ulcer may be recognized in probably 95 per cent of the cases.

7. Gall-stones may be recognized in approximately 50 per cent. Other evidence of gall-bladder disease may be obtained in 25 per cent more.

8. Chronic appendicitis may be diagnosed in practically all instances.

9. Incompetence of the ileocæcal valve may be recognized, and diagnosed only by this procedure.

10. Defects, adhesions, filling defect and abnormal function of the bowel may be recognized by this method better at times than by operation.

11. Diverticulitis may be recognized only by this method and by operation.

12. Carcinoma of the rectum may, at times, be more definitely determined as to its position, location, and its extent than by a proctoscopic examination.

13. Patients generally obtain a great deal of mental satisfaction that is helpful in the cure of their cases, as the result of a complete study of this kind.

ADOLPH HARTUNG.

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES, TENDONS, CONDITIONS COMMONLY FOUND IN THE EXTREMITIES

Barrie, G.: Hæmorrhagic Osteomyelitis and Sarcoma in Bone. *Am. J. Orthop. Surg.*, 1918, xvi, 392.

Barrie discusses at length the differential diagnosis between chronic hæmorrhagic osteomyelitis and the slow-growing true sarcomata in bone. The paper is illustrated with photographs, photomicrographs and radiographs of the several cases presented and includes a diagnostic table comparing the clinical symptoms of hæmorrhagic osteomyelitis and slow-growing sarcoma in bone.

Chronic hæmorrhagic osteomyelitis is not a newly discovered lesion. It has been diagnosed in the past as medullary giant-cell sarcoma.

In 1912 Barrie first drew attention to the fact that the lesion exhibited all the criteria of an inflammatory non-suppurative reparative process and suggested that its proper classification should be among diseases of the inflammatory group.

The numerous giant cells found in these lesions are foreign body in type. Their function apparently is that of a scavenger only. They give no evidence of being tumor-forming cells. If these scavenger or foreign-body type giant cells were eliminated from the microscopic picture in these lesions, the author believes that the histopathologist would be compelled to record a diagnosis of an inflammatory process of low grade type. The gross pathologic picture is exactly similar to that of an exuberant granulation tissue structure excess in any other part of the body.

A true sarcoma should be diagnosed independently of the scavenger giant-cell content in the microscopic field.

Many authors recognize that the lesion does not exhibit malignant properties. It is frequently described as a myeloma. In 1910 Bloodgood classified the disease as giant-cell sarcoma. In 1912 his studies and investigations caused him to conclude that the term "giant-cell tumor" was more appropriate. In his report in *Progressive Medicine* for December, 1918, he makes this statement: "The giant-cell tumor is a borderline lesion between an inflammatory and a neoplastic." This is a concession to Barrie's view.

The paper concludes with the following summary:

1. Investigation and study demonstrate that the same type of scavenger giant cell is frequently present in lesions in bone that are purely inflammatory in character, as well as in true sarcomata of bone.

2. The term medullary giant-cell sarcoma should be abolished because it does not express the true underlying condition existing in bone lesions or neoplasms.

3. The diagnosis of sarcoma in bone should be made from the predominating structure the neoplasm contains, such as fibrosarcoma, myxosarcoma, chondrosarcoma, and osteosarcoma.

4. Granulation tissue proliferation filling in bone cavities should be recognized as an inflammatory and not a neoplastic process. It may be regarded as nature's effort at regeneration and repair.

Rosenow, E. C.: The Etiology and Treatment of Acute Poliomyelitis. *J.-Lancet.*, 1918, xxxviii, 624.

The facts, as stated in the present report, determined since the author's studies on poliomyelitis were begun, indicate that the pleomorphic streptococcus, or the coccus found in such large numbers in the throat and tonsils and in smaller numbers in the nervous system, has a certain etiologic relationship to poliomyelitis.

It is constantly present in the diseased tissues, from which it can be cultivated even many months after glycerolation. On injections of cultures into young rabbits and guinea-pigs it localized specifically in the nervous system and produces flaccid paralysis and changes in brain and cord which resemble those in poliomyelitis in man. From the brain and cord of these animals the organism can be isolated and the disease again produced. The organism has been rendered filtrable. By means of the same methods the identical organism has been isolated constantly from the brain and cord of monkeys paralyzed with

fresh, glycerolated and filtered virus. The serums of persons and of monkeys, having recovered from poliomyelitis, agglutinate specifically the more sensitive strains both from human and monkey poliomyelitis. Injections of the recently isolated aerobic cultures into monkeys render them refractory to virus. The aerobic form of the organism from human and monkey poliomyelitis produces antibodies in the serum of horses, in a large amount common for both, cross-agglutinating these strains specifically in high dilution. The serum of a horse immunized with freshly isolated strains from monkeys protected monkeys relatively against intracerebral inoculation of virus and had pronounced curative effects in the treatment of human poliomyelitis. Early intravenous injections were followed by almost immediate cessation of symptoms in a large series of cases.

The results of Flexner and Noguchi, so far as the cultivation of a small filtrable organism and its demonstration in the tissues in poliomyelitis are concerned, have been corroborated, but the results of the author's experiments indicate that this is the anaerobic and, according to Amoss' results, a non-antigenic form of the organism which, under aerobic cultivation, clearly belongs to the streptococcus group of micro-organisms. Both forms have been constantly demonstrated side by side in the tissues of poliomyelitis. Flaccid paralysis coming on soon after injection has been produced in monkeys with characteristic although not typical changes in the cord with aerobic cultures, but the classic picture as obtained with virus in this species has not been secured. It may be suggested, however, on the basis of results already obtained, that this is due to development of antibodies, since the organism in the aerobic form has marked antigenic powers.

Vitrac, I.: Sarcomatous Development in the Depth of the Right Thigh in the Trajectory of a Recent Wound (Production d'allure sarcomateuse développée dans la profondeur de la cuisse droite sur le trajet d'une blessure récente). *Gaz. hebd. d. sc. méd.*, Bordeaux, 1918, xxxix, 154.

In the case of a soldier wounded in the right thigh, the projectile, a piece of shell, had penetrated through the muscle masses to the popliteal region without injuring either the vessels or nerves. There was some slight infection but the wound healed and cicatrized. A new inflammation followed, then stagnation, with the appearance of a swelling which regularly increased in size without any inflammatory reaction. This was clinically a tumoral condition. The man was operated upon, and the hardened tumor mass, which was situated posteriorly in the injured muscles, was enucleated. Histologic examination showed that the mass consisted of normal muscle tissue with fibroconnective tissue, very dense and thick and enclosing muscle fibers; and also of a central tissue manifestly neoplastic, round-celled, and showing a rich vascular network. Histologically this last tissue was angiosarcomatous.

The author says that he had formerly seen instances in cases operated upon by him, where a deeply situated cicatrix had become tumorous and had increased in volume as in the case now reported. Histologically such are cases of true fibroma developed in a hæmorrhagic or infected area which had never been completely absorbed, and can be classed as fibroconnective tumors. The tumor in the present case belongs to the class of embryonal tumors of sarcomatous type which usually have a quite different origin. W. A. BRENNAN.

Henderson, M. S.: Loose Osteocartilaginous Bodies in the Shoulder-Joint. *Am. J. Orthop. Surg.*, 1918, xvi, 498.

The author discusses three different types of loose bodies, those occurring: (1) by direct trauma, in reality a fracture; (2) by a pathologic condition in the joint surfaces making them more brittle than they should be (osteochondritis dissecans) in which pieces readily desiccate or chip off; (3) by the synovial membrane becoming hypertrophied, the redundant tags becoming cartilaginous on the tip, and as they grow and become heavier, breaking off and becoming free osteocartilaginous bodies (osteochondromatosis); (4) by the marginal osteophytes, resulting from hypertrophic arthritis, breaking off; and (5) as a part of a general process, such as a Charcot joint. He has on a number of occasions removed loose bodies from the knee, from bursæ, and from the elbow, but only once from the shoulder. The history of the case is as follows:

July 9, 1918, a well-developed, robust young woman, aged twenty years, presented herself at the Mayo Clinic for examination, complaining of pain in the right shoulder. The pain was irregular, coming in attacks lasting from one to five minutes, and was followed by complete relief except for a slight aching and soreness. The attacks came on usually when the patient reached for something, particularly if she reached forward, outward, and upward. She had had the trouble since she was eight years of age; there was no history of any previous injury. For months at a time she had absolutely no trouble, but of recent years there had been a tendency for the attacks to increase in frequency and somewhat in severity. The last attack, about two weeks before examination, had been especially severe, causing her to cry out with pain. The symptoms suggested more of a mechanical than an inflammatory condition.

The shoulder was negative to inspection, but on deep palpation there was a suggestion of something slipping under the fingers, as would occur if loose bodies were in the joint. The roentgenogram showed multiple shadows around the glenoid cavity, similar to those cast by loose osteocartilaginous bodies in other joints. July 18, 1918, the right shoulder was opened by a posterior incision. The posterior route was chosen, as the capsule is quite thin in this region and it is only necessary to spread the fibers of the infraspinatus and teres minor before the capsule is met with. By palpation from the outside and manipulation of the shoulder, thus forcing the loose

bodies to a position in which they could be reached with a gall-bladder scoop, ten bodies, ovoid, slightly irregular and rough in outline, were removed.

There was no evidence demonstrable that the bodies originated from the joint surface or the synovia, but as there was present a hypertrophic arthritis, it was thought that they were formed by the marginal osteophytic growths breaking off, wandering about the joint and increasing in size, being nourished by the joint fluid. The capsule was closed, the muscles sutured, and the wound closed in the ordinary manner. The patient's convalescence was uneventful. Microscopic examination of sections of the bodies showed an outer shell of cartilage and an inner nucleus of bone.

Happel, H. E.: The Use of Unna's Dressing in the Treatment of Leg Ulcers. *J. Missouri St. M. Ass.*, 1918, xv, 360.

The author has found the use of Unna's dressing most valuable in the treatment of leg ulcer. This is made up of gelatine, four parts; zinc oxide, four parts; glycerine, ten parts; and water twenty parts. The gelatine is broken up into small pieces and placed in cold water, which is then heated in a water bath until it is melted. The glycerine is stirred in and the zinc oxide added, little by little, until thoroughly incorporated. It is then poured into a can with an air-tight cover and set aside until needed. It solidifies when cold and before application must be placed in a vessel of water and heated until melted, which takes place at 110° F., a temperature which can be borne without discomfort on the skin.

The leg is shaved, if there is much hair, cleansed with soap and water, the ulcer with peroxide, and dried. The liquid is painted on the ulcer and leg from the level of the head of the fibula to the metatarsophalangeal articulations. Over the ulcer a square of six or eight thicknesses of gauze is placed and a coat of paint over this. A two-inch gauze bandage is applied snugly from the toes to just below the knee, carefully covering the heel. A second coat is covered by a third bandage, and over this a guaze bandage is applied to protect the clothing until it is dry, when it may be removed.

In from four to eight days, according to the quantity of discharge, a stain will be noticeable over the site of the ulcer, when a window must be cut so that it may be inspected. If the discharge is considerable, the dressing should be removed, the parts cleansed as before, and a new dressing applied. If not, local applications may be made to the ulcer through the window, and dressings held in place by a bandage until the boot becomes too loose, when it must be taken off. The ulcer will be found to be noticeably smaller, with a floor of healthy, granulating tissue at the edges reaching the level of the skin and surrounded by a bluish border of newly formed epithelium. The second dressing can be worn for a longer time, sometimes for ten or twelve days, before the staining is perceptible.

As soon as the ulcer becomes free from infection and approximately level with the skin, grafting should be performed. The advantages are rapidity in healing and the formation of skin more nearly approaching normal, having greater elasticity and thickness, permitting freedom of movement and rendering subsequent injury less likely than when covered with the thin epithelium formed by granulation. H. J. Van den Berg.

Schauffler, R. McE.: Painful Feet. *J. Missouri St. M. Ass.*, 1918, xv, 387.

The author has noted the tendency of shoe-store specialists to prescribe one of a small assortment of arch supports, or so-called orthopedic shoes, for all sorts of painful feet. He has analyzed 80 consecutive cases from his office records, and his table shows 37 diagnostic heads and sub-headings.

From this exhibit he concludes that a well educated physician is needed to relieve a large percentage of these cases. The conservative treatment consists in shifting the weight from tender areas, or in splinting these feet as much as is necessary to relieve pain and, at least, partly correct deformity, and then gradually withdraw the splinting, making an earnest effort to teach the foot to hold itself in the proper position by the shortening of ligaments and strengthening of muscles, combined with correct shoes, which should have the minimum of alterations or internal appliances neces ary to prevent relapse.

FRACTURES AND DISLOCATIONS

Aird, J. W.: Fractures, Especially as Related to the General Practitioner. *Northwest Med.*, 1918, xvii, 332.

The author believes that the X-ray should be used in almost all cases of fracture as an aid to accurate diagnosis, better reduction, and after-treatment.

He prefers to treat fracture of the clavicle in a recumbent position for three weeks. He also advises the use of the principle of suspension and extension in various fractures.

He himself has devised a fracture frame, similiar to the one described and illustrated in the article by Blake and Buckley in the March, 1918, number of Surgery, Gynecology and Obstetrics.

He now hesitates to use screws, nails, wire bands, and Lane's bone plates except the autograft, and has had splendid success with bone pins and with various kinds of bone grafts. He cautions all but experienced surgeons against treating fractures with the open method.

In compound fractures Aird disinfects the wound with a solution of 20 per cent argyrol, first cleansing the skin and painting it with tincture of iodine.

This work of cleansing is preferably done under spinal anæsthesia. In operating upon all cases of compound fractures, Aird believes in making a large enough incision to insure proper cleansing of the wound and the adjustment of fragments. He also

closes the wound with a rubber drain which is left there for twenty-four to forty-eight hours. If the case be seen from six to eighteen hours after injury, he believes in the removal of all tissues that may have become infected. Later than that, certainly after twenty-four hours, the less done, the better, outside of the removal of all foreign material, the adjustment of fragments, making and keeping ample opening of the wound area for thorough cleansing and after-treatment. This consists of the use of the Carrel-Dakin method or some other form that will cleanse and tend to limit the infection.

Fat embolism is mentioned as a serious complication of fractures. E. C. ROBITSHEK.

Henderson, M. S.: Fractures Considered as Potential Deformities. *Tr. South. Minnesota M. Ass.*, Mankato, 1919.

In this article attention is drawn to the common types of deformities following fractures that come to an orthopedic clinic. They are, generally speaking, consequent to fractures in the region of joints. The treatment of any fracture should be based on an exact diagnosis substantiated by the radiograph. A radiograph taken subsequent to the reduction tells whether the reduction is adequate. The surgeon will be aided in his treatment if he bears in mind the type of deformity that is apt to follow the particular type of fracture he is dealing with and so direct his treatment as to avoid that deformity.

Ischæmic paralysis is too frequently seen, and although not invariably, is generally the result of carelessness in the application of tight splints and too often the disregard of the patient's agony and pain until too late. Non-union is sometimes caused by meddlesome examinations to see if union is complete, by poor reduction and by interposition of muscle fibers, the last named being perhaps the most common. In the author's experience syphilis is a very unfrequent cause; he has seen but one case that might have been due to syphilis.

Following a fracture in the region of the shoulder-joint the common disability is lack of abduction and outward rotation. Treatment with the arm in abduction will guard against the deformity. In the region of the elbow-joint lack of flexion is common and treatment should be carried out with the elbow in acute flexion. A Colles' fracture may be followed by the dinner-fork deformity, with inability to firmly close the fingers. To guard against this the fracture must be correctly reduced. In the hip-joint non-union is common and is usually due to the fact that the injury was erroneously diagnosed as a sprain and no treatment was instituted. Treatment by the Whitman's abduction method, or the Ruth-Maxwell, holds the fragments in position until union has occurred. Under proper conditions bone pegging is permissible. A supracondylar fracture or an epiphyseal separation interferes with the proper transmission of weight-bearing through the joint surfaces and limits flexion and extension. In some of these cases an open operation is the only way to control the fragments. Pott's fracture is commonly followed by a valgus deformity. This should be guarded against by proper reduction and avoiding too early weight-bearing, as the callus may give way. The shoe should be raised on the inner side, and in heavy people an outside iron and inside T-strap should be added.

Leriche, R.: Primary Suture of the Soft Parts in Diaphyseal Fractures (De la suture primitive des parties molles dans les fractures diaphysaires). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 1486.

Leriche thinks that in order to judge the value of primary suture in fracture cases, it is necessary to specify carefully both the anatomic and the etiologic type of the fracture. If all kinds are confounded in the same groups of statistics, the multiplicity of benign cases will falsify the conclusions applied to the more severe cases.

In a recent series of 17 fractures of the femur, which Leriche has followed up to the time of complete recovery, he had 4 immediate primary sutures without any bone operation. These gave 4 successes; 6 successful deferred primary sutures without surgical clearance; 7 fractures not primarily sutured, 5 of which, after isolation, recovered without suturing, and 2 recovered after secondary suture. In the 4 primary suture cases the fracture area did not communicate with the wound, an intact band of muscle intervening. The 6 cases in which a deferred primary suture was done were fractures in which the fracturing projectile did not penetrate but remained against the bone. In the cases of fractures not primarily sutured, the projectile had penetrated the bone in every case.

Leriche thinks that it would be quite incorrect to say that 64 per cent of thigh fractures can be sutured primarily. Hence the necessity of strictly classifying the type of fracture and the results in each class and type.

Leriche thinks however that it may be fairly stated that at the present time, in a non-active period of fighting, 95 to 98 per cent of fractures can be primarily sutured without the least risk and without bacterial examination; also from 60 to 65 per cent of fractures with penetration of the projectile into the bone. W. A. BRENNAN.

Dowden, J. W.: The "No Splint" Treatment of Fractures About the Shoulder, in the Humerus, and the Elbow. *Edinb. M. J.*, 1918, xxi, 328.

Dowden claims that as a result of his "no splint" treatment of fractures about the shoulder, in the humerus, and the elbow it is possible for a patient to return to work in six or eight weeks, regardless of the nature of his occupation. There are thousands of men at the present time with useless joints of the elbow, wrist, and fingers due to long immobilization.

His treatment of fractures is mainly without splints, unless application is found absolutely

necessary. For ten years he has been treating fractures in these regions without splints and has never been disappointed, nor has he ever had a case of non-union or a single bad result.

The patient is encouraged to move his fingers and do what he can with them, carefully to pronate and supinate, flex and extend the forearm, and gently try to move his shoulder-joint and arm, but never to the extent of producing pain. It is surprising how rapidly improvement occurs under this plan, and how soon the patient can put his arm into a coat sleeve. One patient of the author's who fractured his clavicle in February and was treated by this method won the first prize for "putting the weight" at the University sports in June.

All fractures of the humerus are treated with the arm in a sling, plus the application of a posterior splint with a lower projection to the upper arm for the first few nights, much depending on the character of the patient. The splint prevents the patient lying on the arm and passing a restless night, and obvious distortion the next day. In three or four days passive movement is of great assistance, lifting the arm gently from the side backward and forward and bending at the elbow as far as the swelling and pain will permit.

He treats fractures of the olecranon in an exactly similar manner; the gap is ignored, and movement is encouraged on the same principles as the other fractures. In 1909 he first showed such a case in a man, who had as well Colles' fracture of both arms, and, in spite of troublesome œdema, his movements were very fair in four weeks.

He has treated many fractures of one or both bones of the forearm in the same way, but here at times a splint has to be applied for several hours in order to overcome the tendency to pronation.

He has treated several patients with fracture of both bones of the leg by simply making them sit up in bed with the legs hanging over the side. In several cases there was severe and painful swelling; in two there was marked delay in union, and in one bone grafting had to be carried out for non-union. He has endeavored to apply the same principles to the leg as to the upper extremity, but as yet has not been able to perfect a method.

He shows numerous photographs illustrating the method as applied to the upper extremity.

G. W. Hochrein.

Smith, S. A.: The Diagnosis and Treatment of Injuries to the Crucial Ligaments. *Brit. J. Surg.*, 1918, vi, 176.

The literature concerning injuries to the crucial ligaments is scant, but during the war the number of bad knee sprains has brought the question of the anterior crucial ligaments into prominent notice. These ligaments extend anatomically from the intercondyloid notch of the femur to the non-articular area on the upper surface of the tibia and they form part of the mechanism on which the stability of the knee-joint depends. The crucial ligaments stand a large amount of strain in any abnormal movements of the knee-joint. The anterior ligament is tight when the joint is extended, becomes slack in semi-flexion, and tense when the joint is fully flexed. The posterior ligament is tight in full flexion, slack in semi-flexion, and tense in full extension. Extension of the joint, as well as external rotation and abduction of the knee, are all more or less dependent on the action of the crucial ligaments.

The commonest form of knee sprain combines abduction of the knee with external rotation of the tibia, the knee being in the semi-flexed position. The deep fibers of the internal lateral ligament attached to the internal semilunar cartilage become torn and the cartilage either fractures or is displaced. Should the abduction of the knee continue, the entire strain is borne by the anterior crucial ligament or the internal tubercle of the tibial spine becomes avulsed. The severity of the lesion to the anterior crucial ligament depends on the strain to which the knee is exposed.

The following types of lesion may be observed:

1. Due to direct trauma: rupture or stretching of the crucials; with bony involvement, avulsion of the tibial spine, combined with torn or displaced internal semilunar cartilage.

2. Due to mechanical causes (indirect trauma): genu recurvatum.

3. Due to disease: inflammations about the joints; or Charcot's disease, generalized disintegration of all ligamentous structures connected with the joint.

In classifying lesions of the crucial ligaments, it is important to remember that tears are always due to severe trauma, but that stretchings result from continuous strains due to mechanical causes. The anterior crucial ligament is more liable to injury than the posterior. A stretched or torn anterior crucial ligament combined with tearing of the internal semilunar cartilage appears to be a commoner injury than is supposed.

Diagnosis of crucial injuries is made in old standing knee-joint injuries by: (a) locking of the joint; (b) rocking or slipping of the joint combined with a feeling of insecurity.

The general treatment of injuries of the crucial ligaments should be conservative rather than operative. The conditions should be studied by means of the X-ray, and lengthened immobilization with massage, faradism, etc., applied as indicated. When the injuries are of long standing, operative measures are indicated. The following operations have been tried in the earlier cases of the author: plication of a stretched anterior crucial ligament; reefing, i. e., taking up the slack of the ligament by means of a non-absorbable suture; replacement of an anterior crucial ligament by two loops of wire, one fixed through the external condyle of the femur, and the other through the internal tuberosity of the tibia; silk ligament substitution according to the Lange tendon method. Generally, these methods did not give satisfaction.

In the most recent cases the author has adopted the method lately introduced by Hey-Groves of substituting a strip of fascia lata for the crucial ligament. This method is a great advance on all previous procedures and has proved very satisfactory where tried by the author. He has however thought if necessary to modify it by strengthening the internal lateral ligament.

The author's technique is described in detail. He makes a J-shaped incision as for excision of the knee. The patella is divided vertically, and the crucial ligament exposed and examined. A hole is bored by a one-fourth inch drill through the internal surface of the external condyle at the site of the upper attachment of the anterior crucial ligament, and emerges at the upper level of the suprapatellar pouch. The internal tuberosity of the tibia is next drilled beginning anterior to the insertion of the sartorius and emerging on the superior articular surface of the tibia just anterior to the internal tubercle of the tibial spine. A strip of fascia lata one and one-half inches wide is now cut, attached at its bottom and about nine to ten inches in length. A flexible probe is pushed though the tibial drill hole and passed through the femur and pulls the fascial strip with it. As much tension as is thought fit is applied to the new ligament and the tibia is forced backward on the femur as much as possible. The free end of the fascial strip is passed though a channel cut for it in the inner condyle, pulled tight and is sutured to the periosteum around the tibial orifice. The fascia curls as it passes through the bone and makes a ligament about the size of a pencil. The operation is then completed and the wound drained. The limb is kept in a skeleton splint for two weeks, in flexion.

Nine cases of crucial ligament injuries are described by the author. W. A. BRENNAN.

Wentworth, E. T.: Demonstrable Luxation of Sacro-Iliac Joints. *Am. J. Orthop. Surg.*, 1918, xvi, 443.

The author believes that he has demonstrated two cases of definite luxation of the sacro-iliac joint. One, in a woman, dated from the relaxation which occurred during the anæsthesia for a laparotomy three years previous; the other occurred in a man who sustained an injury after being thrown from a horse. Both are able to walk about, not without discomfort, however. Neither has referred pains; there is a dull ache in the region of the sacro-iliac joint; in the first, Kernig's sign is absent, in the second it is present. Forward bending causes no pain to the woman but is painful to the man; backward bending is painful to both.

With the patient standing with his back to the examiner whose hands are placed on the ilia and the thumbs upon the upper posterior aspect of the sacro-iliac joints, the patient is asked to stand alternately on the left foot and then on the right, raising the knee to the chest. As the right thigh passed the horizontal there was heard throughout the room a sharp click, accompanied by a definite sensation of motion under the right thumb of the observer and by pain to the patient.

The X-ray examination revealed the sacrum tilted upward about three-sixteenths of an inch in the woman, but no change was visible in that of the man. R. B. COFIELD.

Willems, C.: Pseudarthroses Following War Wounds (Pseudarthroses consecutives aux plaies de guerre). *Arch. de méd. et pharm. mil.*, Par., 1918, lxx, 350.

Willems thinks that osteosynthesis does not favor proliferation of bone tissue, and that therefore it has few applications even in cases of simple pseudarthrosis with good coaptation.

The bone insert graft (Albee) ought to be utilized for pseudarthroses with loss of substance, and even for simple pseudarthroses when a displacement must be corrected. Osteoperiostic grafts should be reserved for simple pseudarthroses without displacement.

The technique of the bone insert is complicated when the surgeon is not provided with the special Albee instruments, and even with them it requires special dexterity. The osteoperiostic graft is much simpler in its application. Perfect asepsis and a complete excision of fibrous tissues in the vicinity of the fragments are necessary requisites to success. W. A. BRENNAN.

SURGERY OF THE BONES, JOINTS, ETC.

Fenwick, P. C. C.: A Method of Overcoming the Adherence of Tendons After Suturing. *Brit. M. J.*, 1918, ii, 542.

Septic gunshot wounds of the hands and feet often involve tendons which may become adherent to surrounding structures. In a case where the extensor tendons of the hand were involved and a portion of the extensor communis digitorum blown away, the infection was first cleared up and three months later a plastic operation done on the tendon.

A flap of the tendon of the extensor communis digitorum was turned down from above the annular ligament, which was not interfered with. This flap was split into three parts and stitched with silk to the cut ends of the tendons of the three inner fingers. To prevent the newly constructed tendons becoming adherent, they were wrapped with thick catgut, each strand separately, and up as high as the annular ligament. The hand was splinted for three days, then movement begun. Two weeks later faradism was applied to the muscles of the forearm.

The patient acquired full flexion and extension of the fingers. P. W. SWEET.

Leriche, R.: Primary Treatment of Femur Fractures (Traitement primitif des fractures du fémur). *Lyon chirurg.*, 1918, xv, 489.

Leriche says that the mortality of fracture wounds of the femur varies according to the time

elapsed after, and distance from the place of, injury. This may explain the divergency in the treatment and results, as well as the pessimism of some surgeons and the optimism of others.

The gravity of fractures of the femur depends more upon the concomitant injuries of the soft parts, muscles, vessels and nerves than upon the bony lesion. The primary treatment should therefore give particular regard to these injuries and their possible or actual complications, and such treatment should be carried out at the earliest moment and as completely as possible.

At the advanced surgical post the author recommends that a primary amputation should be done:

1. When the patient remains seriously shocked after two hours of active treatment.
2. If there is a serious injury of the common femoral artery or of both popliteal vessels.
3. If several other serious injuries also exist which demand immediate intervention.

The fact of an articular injury to the knee does not call for an amputation.

The conservative treatment given to patients evacuated to the base hospital consists in operations upon the soft parts, which is of paramount importance, operation on the bone, and suture of the wound. Treatment of the soft parts includes not only the freeing and cleansing of the wounds of entry and exit, but complete excision of the tract of the projectile until healthy muscle is met with. Hæmostasis must have minute attention.

With regard to the treatment of the bone, Leriche distinguishes three types of femur fractures:

1. Indirect fractures due to shock from a distance, the projectile not having touched the bone. This may be similar to a simple fracture and treated in the same way, the wound then being primarily sutured.
2. Fractures by contact with the missile, which sometimes remains embedded in the bone, or tangential fractures. In such a case the projectile must be removed and its site thoroughly scraped out. The wound is then primarily sutured.
3. Fractures due to penetration of the projectile through the bone. In this case an esquillectomy (clearance) must be done, with wide opening up of the medullary canal to the limit of the bone injury. The whole bony track should be thoroughly exposed and cleansed, and all free or adherent splinters concealing the medullary track should be removed to avoid osteomyelitis and infective complications. The esquillectomy should be done by the subperiosteal method with a sharp Ollier's rugine; each splinter is fixed by a forceps and the bone sharply scraped so that finally the periosteal fibrous coat is lined by scaly bone fragments. Suture of the wound is done three to five days after the first intervention, depending on the clinical appearances of the wound and the general condition rather than upon a bacteriologic examination.

Leriche advises against an immediate osteosynthesis, as his experience shows that this delays regeneration. It if is necessary in certain cases, he performs the operation not earlier than a couple of weeks after the primary intervention.

In the author's first series of cases of severe femur fractures treated at a distance of 40 kilometers from the battle line, the mortality was 40 per cent. In a second series where the distance was 100 kilos from the front, he had no deaths. W. A. BRENNAN.

Tavernier, L., and Jalifer: Treatment of Flail Joints Following Resections (Traitement des laxités articulaires consécutives anx résections). *Lyon chirurg.*, 1918, xv, 399.

The authors report their experience in the surgical treatment of flail-joints occurring after defective resection or resection with too free an excision of bone. Five cases of elbow flail-joint were treated by shortening the lateral ligaments, but this method did not relieve the patients from wearing a prosthetic appliance. In 3 cases in which the idea was to transform the flail-joint into an ankylosis, the authors performed an ulnohumeral osteosynthesis by bronze wire sutures. The result was a solid joint but not complete ankylosis, movements being preserved to an extent of 20°.

The authors treated 3 flail-joints of the shoulder; 2 by fixing the humeral shaft to the glenoid cavity and to the acromion; 1 by acromial fixation alone. This latter appeared to give better functional results.

Two excellent results were obtained on the wrist by ulnar and fibular grafts to replace the radial waste and ulnocarpal and radiocarpal suturing. These two patients preserved limited movements in a solid joint and even some degree of pronation and supination.

The authors operated upon one case of flail-joint of the knee by osteosynthesis. In the case of the knee, complete and solid ankylosis is absolutely necessary for the functional use of the limb; and articular laxity demands a secondary operation.

Although the authors have only operated in cases of actual flail-joints, their results have been so satisfactory that they think that every case of exaggerated laxity should be treated by metallic sutures. W. A. BRENNAN.

Bosch Arana, G.: General Technique for Cineplastic Amputations, with a Method by the Author (Tenica general para las amputaciones cineplásticas con un procedimiento del autor). *Semana méd.*, Buenos Aires, 1918, xxv, 201.

The author describes the difficulties which are met with in the formation of plastic motors on amputation stumps according to the Vanghetti method. These difficulties arise from the skin, the muscles and the bone, especially in old stumps in which the original amputation was done without considering a later plastic operation. One of the greatest difficulties is in obtaining epidermatization of the tendon and muscle loops and knobs which form plastic motors, and more especially dermatization of the eye of a loop motor.

To obviate these difficulties Bosch Arana has devised a special technique of his own which is divided into six stages. He first makes four longitudinal incisions equidistant from each other around the end of the old stump, which in the case illustrated is a tibial stump. These incisions terminate about 3 cm. from the bottom of the stump and run from 8 to 15 cm. long according to the total length of the stump. The skin strips between these incisions are dissected subcutaneously so that four subcutaneous bridges or tunnels are formed. An extraperiosteal dissection of the bone is then made, followed by sawing and complete resection of the bone end out of the stump by the bistoury. When the bone has been entirely removed, all muscle parts which cannot be utilized to form a plastic motor are resected out through the bridges, and the cutaneous bridges are then sutured together by the edges over the remaining muscles to form a ring motor with a completely dermatized eye.

The steps of the operation are fully illustrated by the author. He has obtained excellent results with this technique. W. A. BRENNAN.

ORTHOPEDICS IN GENERAL

Elmer, W. G.: Surgical Technique in Orthopedic Surgery. *Ann. Surg.*, Phila., 1918, lxviii, 646.

In the first part of this paper the author describes the technique employed for general surgical operations in an ordinary operating room. He lays particular stress on the methods of sterilization commonly employed, mentioning some of the weak links in the chain of surgical technique which may be capable of causing a complete breakdown in surgical asepsis, and result in failure to secure primary healing of the operation wounds.

First, he considers the gutta-percha gloves. These gloves are generally sterilized in the autoclave for either ten or twenty minutes, depending on whether they were used in a clean or septic case. Gutta-percha is impervious to steam, and when the gloves are folded, wrapped in muslin and piled in bundles in the autoclave, it is impossible for the steam to reach all parts of the glove. Air pockets may occur within the fingers or thumbs and these permit only dry heat sterilization instead of moist heat, for twenty minutes. While boiling water at 210° F. will destroy all organisms and their spores in five minutes, it requires an exposure of one hour at a temperature of 350° to destroy germs by dry heat. Therefore, the autoclave falls short of this by nearly 100° in temperature and forty minutes in time.

To avoid all possibility of doubt as to the gloves being sterile, the author insists that his gloves be washed with soap and water, turning them inside out while doing so. They are then filled with water to remove the air and immersed under the surface of the boiling water and held down by a piece of wire screen, so that they cannot float up to the top and be exposed to the air. They are boiled five minutes by the clock. When the water cools, the nurse, wearing sterile gloves, removes them, dries them with a sterile towel, powders them inside and out with sterile talcum powder and folds back the gauntlet. Into this she tucks loosely a small gauze pad covered with talcum powder, which the surgeon uses for dusting his hands. The gloves are then placed without folding in a muslin cover and put into a large glass jar. Just before they are needed for operation, the muslin packets are placed full length in the autoclave, lying loosely in rows, not packed in compact bundles, and sterilized for twenty minutes. In this way the steam reaches every part of the glove.

Another object which may be the carrier of a deadly virus is the sand pillow. It should be sterilized in the same manner as the gloves. The same applies to the pad covering the operating table.

As to the instruments, only the number required for each operation should be sterilized. This may be done by boiling for ten minutes in water to which a tablespoonful of carbonate of soda has been added. The knives are not boiled, but are washed carefully and are sterilized for operation by immersion for twenty minutes in a 1/20 carbolic solution or 3 per cent formalin. They are removed by a sterile forceps to a tray of 85 per cent alcohol.

Silk is prepared by boiling for ten minutes in a 1/1,000 bichloride solution and then for ten minutes in plain water. The tubes containing the catgut should be boiled with the instruments and then placed in a tray of 1/20 carbolic solution or 3 per cent formalin.

The second part of the article is an outline of the surgical technique employed in the Orthopedic Department of the University Hospital, Philadelphia.

The patient is prepared for operation by the administration of a cathartic followed by a simple enema the day preceding the operation. The part to be operated upon is prepared by scrubbing for ten minutes with green soap and sterile water, then washed with plain sterile water, scrubbed with warm 1/2,000 bichloride of mercury, douched with sterile water, and sponged with 85 per cent alcohol. The part is then covered with dry sterile gauze and bandaged.

The instruments used in the operation are sterilized as outlined in the first part of the operation.

A list of the instruments usually required in orthopedic operations is appended.

G. W. HOCHREIN.

Merrill, W. J.: Distortion of the Pelvis from Posture. *Am. J. Orthop. Surg.*, 1918, xvi, 492.

In women the habit of standing on one foot prevails by a greater percentage than in men. When the weight is borne on the right leg, for instance, as a rule the abductor muscles of that leg are relaxed, the pelvis tilts to the left, the left leg is bent, and there is a left lumbar scoliosis with increased lordosis. The excursion of the pelvis to the left and in forward rotation is usually to the extreme limit of movement. There is a resulting increased prom-

inence of the left ilium and a relative elevation of the left anterior superior spine. The two ossa innominata are rotated in opposite directions, the right forward. The length of both legs from anterior superior spine to internal malleoli will be unequal therefore, although actually their length is the same.

When there is torsion of the pelvis or some other malformation or deformity present, an X-ray plate should include the pelvis and heads and trochanters of the femora. This will determine whether a difference in the length of both legs exists.

J. J. KURLANDER.

SURGERY OF THE SPINAL COLUMN AND CORD

Rossi, A.: Sciatica of Skeletal Origin Due to Vertebral Anomalies and the Syndrome of Bertolotti (Sciatiche di origine scheletrica da anomalia vertebrale e la sindrome del Bertolotti). *Chir. d. organ. d. mov.*, Bologna, 1918, ii, 582.

The author treats of those rebellious sciaticas which are traceable to congenital deformities in the lumbar spine and especially to congenital fusion of the fifth lumbar vertebra and the sacrum. The true origin of these sciaticas was first explained by Adams and Goldthwait in the United States in 1910. The author however states that the first complete and original investigation of the whole subject was made by Bertolotti in 1917, and he endeavours to claim credit for the Italian author by naming the symptom-complex of the condition as "Bertolotti's syndrome."

Rossi sums up the fundamental and characteristic diagnostic elements of the syndrome as follows:

1. The onset of the clinical manifestations are usually observed after the twenty-first year of life, especially between the twenty-fifth and thirtieth years. There is thus a latent period of development.

2. In symmetrical sacralization of one or more lumbar vertebræ the most salient symptoms are constriction in the lumbar region and pain; objectively the dorsal region is flattened, due to reduction or shortening of the normal lordosis of the spinal column; active and passive movements are united; there may be curvature as a lordosis or scoliosis; ischialgic pain is experienced generally in the lumbosacral region, simulating neuralgia, intermittent as regards time and the position of the patient. When the deformity in the sacral region is symmetric, trophic disturbances are frequent and there may be sensory disturbance.

3. In asymmetrical sacralization the symptomatology is unilateral and is characterized objectively by spinal curvature as a lordosis or scoliosis.

4. Sacralization of the fifth lumbar vertebra is a frequent complication.

In about 400 radiologic examinations of the lumbar and lumbosacral region Bertolotti found the fifth lumbar fused with the sacrum 5 times and cleared up several doubtful diagnoses. Rossi in a large number of similar examinations found 22 cases of skeletal malformations associated with the fifth lumbar. He gives the detailed subjective and objective symptoms of these cases with illustrative radiographs. The percentage of such cases is constantly being augmented as research proceeds.

Congenital sacral and fifth lumbar fusion must from the findings of the author and others be considered as frequent. The symptomatology is distinct and is in accordance with the syndrome already described. The electrical reactions show a true peripheral neuritis of the sacral plexus, sensory as well as motor, bilateral when the fusion is symmetrical, unilateral when asymmetrical. The typical neuritis is accompanied by limitation of the lumbar movements, flattened dorsum, increase of the bi-iliac diameter if the deformity is symmetrical, scoliosis or lumbar kyphosis if unilateral. The neuritis is more usually gluteal, often involving the sciatic, etc. In the majority of the clinical cases, the age of the patient is between twenty and thirty-five years, and exceptionally the condition has remained quite latent. A trauma is occasionally the cause of the onset of the symptoms, or it may follow an infection or polyarticular rheumatic attack.

The mechanism of the nerve lesion is not explainable by compression of the fifth lumbar nerve alone; it is often complex, and straining of the cauda equina may account for this disturbance. An arthritic process or a perineuritis may be present when an infection involves the fifth lumbar.

Treatment of the condition may be medical or surgical. In the majority of cases the first suffices. Prolonged rest, the use of an orthopedic apparatus, electrotheraphy, baths and X-ray treatment at the site of pain suffices usually. Faradization of the muscles may be added when necessary, with massage. But when such means fail, operation on the affected transverse process may be necessary; or bone grafting may be called for to effect a radical cure.

W. A. BRENNAN.

Hibbs, R. A.: Treatment of Vertebral Tuberculosis by Fusion Operation; Report of 210 Cases. *J. Am. M. Ass.*, 1918, lxxi, 1372.

The author reports 210 cases of spinal tuberculosis operated upon by his operation of fusion. The interval of time since the first operation was seven years, since the last three and one-half.

The operation was designed for the purpose of eliminating motion between the diseased articulations. Absolute elimination of motion in a joint cannot be accomplished without osseous fusion of the bones forming the joint. To accomplish this, all tissue other than the bone must be removed from between the articular ends. The spinous processes,

laminal and lateral articulations are well adapted for operative fusion because of their accessibility, and because they are rarely involved in the disease.

The spinous processes of the segment to be fused are exposed. Beginning at the upper end, the periosteum and interspinous ligament are split. The periosteum is then separated from the spinous processes and laminæ to the base of the transverse processes, exposing the lateral articulations. The lateral articulations are opened, and the periosteum and ligament are curetted from the adjacent edges.

Beginning again at the upper end, a piece of bone is turned from each lamina, from above downward, resting on the lamina below. Each spinous process is then fractured so that its tip rests upon the bare bone below. The periosteum and ligament that have been split and pushed to one side are now brought together by interrupted sutures. An immobilizing brace is applied. By this means a tube of periosteum encloses live healthy bone fragments, lying in continuous contact. The area of fusion will depend upon the thoroughness and extent of the dissection. The number of vertebræ fused will depend upon the extent of the disease.

The patient is kept in bed for eight weeks, and wears a brace for from six months to a year. The general hygienic and dietetic treatment of tuberculosis is also carried out.

There has been no operative mortality, and practically no shock. One hundred and fifty-seven, or 74.7 per cent were cured. Twenty-two were doubtful, and thirty-one died. J. R. BUCHBINDER.

SURGERY OF THE NERVOUS SYSTEM

Souttar, H. S., and Twining, E. W.: Injuries of the Peripheral Nerves from the Surgical Standpoint. *Brit. J. Surg.*, 1918, vi, 279.

The authors report 148 cases, with the methods and results of treatment. There were 61 cases treated by suture, resulting in 7 complete recoveries, 32 prospects of recovery, 7 doubtful cases, 2 failures, and 13 unknown results. Treated by neurolysis, 24 cases gave 7 complete recoveries, 16 prospects of recovery and 1 doubtful case. Treated by anastomosis, 5 cases gave 1 complete recovery, 3 prospects of recovery, and 1 failure. Of 58 cases not operated upon, there were 24 complete recoveries, 13 prospects of recovery, 2 doubtful cases, 11 failures, and 18 unknown results.

One lesson that has been impressed upon the authors is that success in nerve surgery is a matter of organization. The investigation of the cases is so complex; the operations involve such unusual details of experience and technique, and the after-treatment is so tedious and varied, that only by means of an extensive organization can they all be satisfactorily carried out. The highest operative skill is of no use in the face of incompetent physicotherapy, while the most perfect physical treatment will not remedy the mistakes of a clumsy surgeon.

All nerve cases should be cared for in centers where they will have at their disposal the extensive material resources, the clinical experience, and the trained patience without which their recovery is a matter of chance.

In the authors' special department a careful examination is made and recorded as soon as the patient's condition permits it to be made. This examination is repeated once a month, and in the meantime he is under close daily observation. When he leaves the hospital, attempt is made to keep in touch with the patient or his medical adviser; and only in this way is it possible to keep the records upon which the man's treatment can be scientifically founded. Only in this way the formation of contractures can be prevented which may mean permanent and unnecessary disability, and the psychological moment for operation be chosen. A chart shows the monthly examination of each patient. In a journal is kept an exact record of his progress, sensory, motor, and electrical. He is given a card on which are entered the details of his treatment for the coming month, and each treatment that he receives is entered daily.

In operating the surgeon should follow a simple and precise routine. He should have as clear and accurate knowledge as is possible of the anatomy of the affected region and of the condition of the nerve. He should have a clear idea of what he means to do, and he should do it in the simplest way.

The physical treatment of the case before and after examination should be based on a definite routine, although it should be directed to the special requirements of the patient and should introduce all possible variety. In short, the patient should feel that he is surrounded by a powerful organization, skillfully directed toward his cure, and it should be the aim of the surgeon to make the organization so perfect that a man may be supported through the tedium of many months by the knowledge that his cure is the inevitable result.

The authors give full details of the method of examination, sensory, trophic, etc; of the care of the limb; of the indications for operation, as well as of the operative technique. In civil surgery nerves are frequently sutured in clean wounds a few hours after injury. In military surgery this does not occur and usually the peripheral portion of the nerve has passed through the complete process of wallerian degeneration before suture is attempted. In the sensory fibers the process of recovery after complete degeneration will be the same whether the recovery occurs spontaneously or after resection and suture. On the motor side the first evidence of recovery observed is a shortening of the period of relaxation after galvanic

stimulation. In the authors' experience faradic response and voluntary power return almost simultaneously. W. A. BRENNAN.

Fasano, M.: Surgical Intervention in Gunshot Wounds of the Nerves (Sull'intervento chirurgico nelle ferite dei nervi da proiettili di guerra). *Policlin.*, Roma, 1918, xxv, sez. prat., 1049.

From his experience in the treatment of the war injuries of nerves, Fasano thinks that when there is paralysis alone without pain, it is debatable whether or not to await cicatrization of the wound before operating upon the nerve. On the one hand, there is the gain of an aseptic field, but on the other, there is muscular atrophy, rigidity, and ankylosis to be considered. When intense pain is present, immediate intervention without awaiting cicatrization is justified.

The author gives the clinical details of some cases. W. A. BRENNAN.

MISCELLANEOUS

CLINICAL ENTITIES—TUMORS ULCERS ABSCESSES ETC.

Centanni, E.: Atrophy of Tumors Produced by Means of Blastin-Free Diet (L' atrofia die tumori per mezzo della dieta ablastinica). *Riforma med.*, Napoli, 1918, xxxiv, 626.

The author reviews the various attempts which have been made in the past for producing atrophy of tumors, which he states have resulted in failure. He then takes up the attempts at the alimentary treatment of tumors. His own initial experiments along these lines showed that if the food was simply reduced in all its elements, all the cells of the body including the tumor cells suffered and nothing special was gained in the struggle of normal cells against the tumor. The ideal method was to concentrate alimentation on certain elements alone, to starve the tumor of substances of which it was most greedy and which it most needed. Such substances were evidently those that favored its proliferation. These substances have been variously termed auxetics, Wuchsstoffe, or blastins, which latter term the author uses.

The author's first experiments with vitamine-free foods were taken up in America by Sweet, Carson, White and Saxon. They used foods which without influencing the general health lacked some elements necessary for normal growths. It was clearly seen that the growth of a tumor could be inhibited or made to disappear in mice under the influence of such diet.

In his own further researches the author found that the principal sources of blastins were the vitamines, the internal secretions and certain nucleinic and phosphoric chemical preparations. In his experiments he endeavored to use foods which were quite free from these. The food was denatured by exposing it to a temperature of from 125 to 130°. The general result is that, the tumor being deprived of its principal need while the normal cells are not, the struggle between the two is turned in favor of the normal cells and the tumor cells cannot live.

The experiments carried out by the author concerned the ordinary grafted adenocarcinoma of mice. There were altogether 92 series of 4 to 10 animals in each. The results were:

1. With hyperalimentation by the usual foods 100 per cent of grafted cancer "took" and increased so rapidly that it reached a size greater than the whole body of the mouse (mouse weighed 18 gr., the tumor 25 gr.). The appearance and rapidity of growth of the tumor could be altered by varying the composition and amount of the diet.

2. By giving preventive blastin-free food for ten days before grafting, the tumor either did not "take" or after an initial attempt withered and disappeared.

3. By giving blastin-free food in the case of well established tumors which had not yet reached maturity, the growth of the tumors was arrested and they were finally reabsorbed, leaving no trace.

4. In the case of large tumors after a short period the center of the tumor softens and shows necrotic ulceration.

5. It was found that large tumors were storehouses of blastins, and that ulcerated tumors were sources of intoxication. In such cases therefore before the atrophying diet treatment, a large portion of the mass of the tumor was resected. The remaining portions were then found to become gradually reabsorbed as the animals were fed on the diet.

6. The author finds that mice which have recovered from tumors under blastin-free treatment have remained quite free from recurrences.

Centanni considers his researches most important in modern experimental work. He thinks that the treatment can be extended to human tumors and that it should be very favorable: (1) because tumors do not reach the same relatively large volume in men that they do in mice; and (2) because men are particularly sensitive to blastin-free alimentation. There is however the point to be considered that in the human subject the tumor arises spontaneously and the conditions for its disappearance may be different. Centanni does not consider that blasting-free diet would cause any particular disturbances in the human subject, or at least none that could not easily be remedied W. A. BRENNAN.

Bovie, W. T.: The Localization of the Physiological Effects of Radiation Within the Cell. *J. Med. Research*, 1918, xxxix, 251.

In some investigations reported in previous papers, living cells (paramecium caudatum) were

exposed to ultraviolet radiations of two different wave lengths and the resulting functional disturbances observed. Although the radiations used were from the same general region of the spectrum and the difference in wave length was less than 0.12 microns, the physiological effects produced were strikingly different.

A survey of the literature reveals the fact that rays from widely separated regions of the spectrum, provided their ability to penetrate the organism is such that similar parts are radiated, produce similar physiological effects regardless of the difference in wave strength. In other words, it is the instability of the physiological mechanism rather than the wave length of the radiation used which determines the nature of the physiological effect produced.

If two kinds of radiation have a difference in penetrating power such that the effect of the one is strongly localized near the surface of incidence, while the effects of the other extend deep into the organism, obviously there will be a difference in the physiological effect produced. Information concerning the penetration of ultraviolet radiation into tissues is indicative of a sufficient difference in the penetrating power of the rays used in the experiments referred to above to account for the observed differences in physiological effects. It seems reasonable therefore to postulate that the differences are due to a difference in penetrating power rather than to any action specific for wave length. By selecting rays of proper penetrating power, the place of action within the cell is localized. The basic principles of the method are applicable to the study of the action of rays in general, and an extension of their use will, it is believed, open up new lines of biological investigation.

Bovie found that the localization of the place of action of radiation within the organism depends upon two principles: first, selective absorption of rays; and second, hypersensitiveness to the influence of rays. The application of the principle of selective absorption will be made possible by determining the absorption of radiation by different kinds of tissue elements. The application of the principle of hypersensitiveness to the influence of rays will be made possible by careful physiological studies of organisms which have been radiated. In connection with the absorption of rays it must be pointed out that absorption alone cannot be used as a measure of physiological action because physiological action does not depend upon the amount of energy absorbed, but upon the kind of processes initiated through the transformation of the absorbed energy.

Whether selective absorption will take place depends upon the kind of radiation used and the nature of the absorbing tissue. The laws of absorption of radiation have been discussed in a previous paper, but for the sake of completeness they will be repeated here:

When both the tissues and radiation are homogeneous in character, then, according to Lambert's law, each layer of tissue of equal thickness absorbs an equal fraction of the radiation which traverses it. Hence, as the thickness of the tissue increases in geometrical progression, the radiation intensity decreases in geometrical progression.

Knowledge of the physiological effects of radiation is not sufficient to enable one to lay down fundamental principles concerning the hypersensitiveness of different kinds of protoplasm to the influence of rays. It is known that some kinds of protoplasm such, for example, as that composing the so-called "eye spot" of the single-celled organism, euglena, are extremely sensitive (as compared with other parts of the cell) to the influence of light rays. In this case, the hypersensitive region is provided with a pigment which increases absorption. Whether it is the pigmented protoplasm itself or the protoplasm closely associated with it, which is hypersensitive, has not as yet been determined.

There is some evidence that certain parts of most cells, the nucleus, for example, are more sensitive to the influence of rays than other parts. Again, cells in a rapidly growing condition appear to be more sensitive to radiation than cells which are at rest. Evidence concerning these matters must be very carefully examined, however, before categorical statements of hypersensitiveness can be made, because knowledge of the functions of the cell is limited, and what may appear to be specific hypersensitiveness may be nothing more than an expression of the limitations of experimental methods. Disturbances of functions were observed only where the author knew where to look for them.

Organisms receiving short exposures to quartz rays differ from enucleated cell fragments in that the "photo-enucleation" is only temporary, and it seems reasonable to suppose that more careful study will show that with shorter exposures the enucleation is not complete and that certain nuclear functions may be only slightly or not at all interfered with.

Bovie concludes his experiments by saying these studies give a clearer notion of the nature of the action of rays. It seems apparent that the rays affect the protoplasm at the place where they are absorbed, and that the observed physiological disturbances are the responses on the part of the organism to its protoplasm. GEORGE E. BEILBY.

Crile, G. W.: The Value and Limitations of Laboratory Studies of Acidosis in Surgery. *Ann. Surg.*, Phila., 1918, lxviii, 457.

The author cites experiments to show the relationship between acute blood acidosis, diminished reserve alkalinity, and shock. In his study with Menten of the H-ion concentration of the blood he found this to be increased during intense fear, rage, extreme exertion, inhalation anæsthesia, surgical shock, hæmorrhage, asphyxia, alcoholic intoxication, etc., but the H-ion was not increased during narcosis by opium and its derivatives, sleep, protracted consciousness unbroken by sleep, except near death, serious infection, exophthalmic goiter, etc.

The limitations of the value in study of reserve alkalinity and acid excretion were shown by unexpected variations in the clinic where acute infections, bad cancers, and good and bad risks of all kinds were observed. Often desperate cases which died showed a reserve alkalinity as great as that of the observer.

The author therefore believes that the laboratory methods are of meager clinical value so far as the studies of H-ion concentration, carbon dioxide tension, the reserve alkalinity of the blood, and the acid excretion of urine are concerned. These methods furnish only the degree of failure of the corrective mechanism, giving no clue to the possible intracellular acidosis as the fundamental condition present in shock or exhaustion from any cause.

Duval, P., and Grigaut, A.: War Wound Intoxication; Nitrogenous Disintegration of Traumatized Tissues (L'intoxication par les plaies de guerre; la désintégration azotée des tissus traumatisés). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 1506.

Since 1918 Quénu has taught that shock is an intoxication due to absorption of products of albuminoids derived from injured tissues. The authors have undertaken a research into the validity of this theory and as a result they are in full accord with the theory that the toxic phenomena in primary shock directly originate from an intense and rapid nitrogenous disintegration of the traumatized tissues.

The contents of non-proteid nitrogenous substances vary from 3 to 3.1 gr. for 1,000 gr. of muscle; while it is only 0.23 gr. for 1,000 in plasma. The figures are constant for all mammals. The retention of part of its nitrogen by the muscle can only be the effect of some active process of the cellular membrane, because the nitrogenous substances are quite dialysable and the nitrogenous contents of muscle and plasma would hence tend to unite.

Passage of nitrogenous substances into the blood only becomes operative when the muscle nitrogen passes above the figures of about 3.3 gr., which may be considered as the fixed constant for nitrogenous secretion of the muscle cell. A nitrogenous reserve is retained by the muscle but under the influence of traumatism part of this is released and passes abruptly into the blood. Two tablets given by the authors show that the nitrogenous contents of traumatized muscle is considerably less than that of healthy muscle, varying from 1.39 to 2.50 gr. per 1,000 gr. of traumatized as against 3.47 to 3.68 gr. for healthy muscle.

One of the first effects of traumatism therefore is the inhibition of the cellular membrane which permits all the crystalloids to pass from the muscle into the blood. Fermentative and microbic processes facilitate. Normally the blood is poor in non-proteid nitrogenous substances, the figures being 0.23 gr. for the total blood and 0.48 gr. for the red corpuscles, for each 1,000 gr. of blood. In the wounded, increase of nitrogenous contents is the rule. It reaches its maximum generally about the second day. No matter what may be the complicating circumstances, infection, icterus, etc., the increase of non-proteid nitrogen of the blood remains limited in the minority of the wounded and only rarely exceeds double the normal.

But it is different in the case of the shocked. It is exceptional in such cases to find figures of nitrogenous content which are not very much higher than double the normal value of such substances. This increase involves both the cells and the plasma.

The general evolution of the curve showing nitrogenous substances in the blood of the shocked varies according to the tendency toward recovery or death. If the tendency is toward recovery, the total non-proteid nitrogen contents diminish gradually; if the evolution is toward death, there is a constant increase. Although the condition parallels the nitrogenous retention in Bright's disease, there is this difference that in Bright's disease there is a retention of urea, while in the shocked it is a retention of residual nitrogen.

The presence in the organism of the wounded of an abnormal proportion of residual nitrogen, which represents the total of the non-proteid nitrogenous substances having escaped urogenesis, is the direct cause of the phenomena of intoxication, the measure of which it furnishes. Liver conditions are secondary and liver insufficiency is the result of the sudden afflux of the nitrogenous substances liberated by the traumatized tissues.

These facts clear up the pathogenesis of shock in the wounded. The degree of intoxication is a function of the extent of the tissue territory injured, i.e., of the abundance of nitrogenous reserves freed.

In the discussion Delbet stated that he was investigating the action of the liberated nitrogenous toxins on the central nervous system and made a short reference to some of the effects perceived.

W. A. Brennan.

De Almeida, A. O., and De Almeida, M. O.: The Nature of Surgical Shock and Henderson's Theory of Acapnia. *J. Am. M. Ass.*, 1918, lxxi, 1710.

For the purpose of verifying Henderson's experimental work, and his conclusions on the relationship between acapnia and shock, the authors carried out a set of animal experiments.

Excessive artificial respiration for four to five hours in an experimental animal was carried out. The animal did not show the slightest symptom of shock, and in those experiments where the thorax was not open, was able immediately afterward to stand up.

In looking for the unknown factor that caused results to differ from those of Henderson, it was discovered that the average temperature and humidity of the air was higher than was the case in Henderson's experiments. This factor prevented any appreciable modification of the internal tem-

perature of the animal. Thus, although acapnia was produced, shock did not occur.

Upon simulating the atmospheric conditions of Henderson's experiments, by producing sufficient internal cooling of the animal, coma, followed by death, results. The authors feel that shock as observed by Henderson was nothing more nor less than this coma itself. The following conclusions are deduced:

1. Excessive and prolonged artificial respiration produces coma and death only when produced by a sufficiently low temperature and humidity.
2. If the temperature and humidity be raised, respiration may be prolonged indefinitely without obtaining this result.
3. Acapnia therefore bears no relation to coma.
4. The coma that results from internal cooling as produced by Henderson is not shock.
5. Henderson could not obtain what he thought was a condition of shock with expirated air because the latter contained sufficient moisture and was of a high enough temperature to prevent this internal cooling.

J. R. BUCHBINDER.

Tymms, A. S. M.: Emergency Surgery. *Med. J. Australia*, 1918, ii, 449, 466.

Tymms reports three cases with their histories, in which disease of the pancreas made immediate operation necessary. In the first of these cases, the process was of the acute type, hæmorrhage predominating, and though an abscess formed later, infection did not appear marked, as evidenced by the condition of the gall-bladder and ducts. The other two cases correspond to the subacute type. Presence of blood-stained fluid in the abdomen demands, according to the author, a differential diagnosis of acute pancreatitis from perforation of the gall-bladder, perforated gastroduodenal ulcer, acute gastritis, appendicitis with perforation, and intestinal obstruction.

The only cases met with in emergency operations upon the liver by the author were rupture from trauma. He reports three such cases seen by himself. He believes the risk of operating upon a shocked patient is great, but it will be greater when hæmorrhage is well established. Laparotomy should be influenced as much, if not more, by the nature of the injuring force as by the clinical signs present.

In the spleen, rupture from trauma occurs under the same conditions as that of the liver. It is, however, more often associated with injury to the left kidney. Usually it is injured by a crushing of the loins, such as is produced by the wheel of a vehicle even when it does not pass over the body. Along with its pedicle, it is liable to injury from blows and falls, resembling in this respect the jejunum. Hæmorrhage is difficult to control on account of the mobility of the organ and its great vascularity; and splenectomy is more frequently indicated than mere plugging or suture of the laceration. One case is reported in which splenectomy was found necessary.

In the case of the kidneys, the author emphasizes the care necessary in making a differential diagnosis. Thorough systematic examination in every case prior to operation should be made.

Conditions affecting the fallopian tubes for which operation may be necessary are chiefly salpingitis and tubal pregnancy. Tymms saw no cases of ruptured ectopic gestation, but found that operations for salpingitis constituted 6 per cent of the total, 3 per cent of all abdominal operations, and 78 per cent of the operations performed for all primary pelvic conditions. He divides the cases into the early and old cases, of which three were of the former and eight of the latter. Tuberculous affection of the tubes was not encountered. In the case of the ovary the author reports operating upon one case of an ovarian cyst with a twisted pedicle and a case of metastatic ovaritis following mumps.

Conditions of the uterus that would be likely to come within the scope of immediate operation, apart from an occasional abortion or infected uterus, are acute changes occurring in tumors of the organ or complications arising from their presence in the pelvis.

E. C. ROBITSHEK.

SERA, VACCINES, AND FERMENTS

Duval, P., and Vaucher, E.: First Results of Systematic Trials of Antigangrenous Preventive Serotherapy (Premiers résultats des essais systématiques de sérothérapie préventive antigangreneuse). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 1535.

The antigangrenous sera employed by the authors were obtained from the Pasteur Institute and were as follows: serum antiperfringens, serum anti-œdematicus, serum antivibrion-septic.

As a preventive, 449 wounded men (principally limb wounds) were injected, the dosage varying from 20 to 30 ccm. of the antiperfrigens serum and 10 to 20 ccm. of the others. The higher doses were given when the interval elapsed since injury was longer or when an important vessel was found injured in the course of operative treatment. Fifty-five of these patient died within the first twenty-four hours owing to the severity of their injuries; 281 have been followed and among these were 18 cases of gaseous gangrene, 10 of which resulted in death. The percentage of death from gangrene thus established (4.7 per cent) in the case of severe wounds is less than the usual percentage, i.e., about 16 per cent.

The authors draw attention to the fact that intramuscular should be associated with intravenous injections, especially in cases in which the larger doses are found necessary.

Eleven of the cases which developed gangrene after preventive injections of serum showed an important arterial lesion; and in the greater number no intramuscular injections had been made in the vicinity of the lesion. The later results obtained show the necessity of making these local injections and repeating them every two or three days, when an arterial lesion exists.

The authors' bacteriological study of cases of gaseous gangrene in patients having received preventive treatment is not yet complete; but in 2 cases they are able to say that the gangrene was due to microbes other than those against which they had attempted to immunize the organism.

In 77 cases in which curative antigangrenous serotherapy was tried, the authors have had 16 deaths, 8 amputations, and 53 recoveries without amputation.

The conclusions drawn from the authors' study are as follows:

1. Preventive serotherapy of gaseous gangrene by antiperfringens, antivibrion, and anti-œdematicus sera is an absolutely justifiable method which ought to be generally adopted.

2. The proportion of gaseous gangrene seems to have been clearly lowered in the wounded who received preventive injections: 4.7 per cent in the severely wounded particularly exposed to gangrene, and 15 to 18 per cent in non-injected cases.

3. If the preventive inoculations can be made in the advanced posts very early after injury, it may be hoped that the percentage of failures will be much reduced.

4. The doses and methods of the injections practiced by the authors seem to give the best results.

5. Many failures can be explained by the fact that the dosage of injection was insufficient, or that intramuscular injection in the affected area was not done.

6. Serotherapy can only be an aid to the surgical operation, which is always necessary. It can never obviate nor retard surgical treatment when indicated.

7. Serotherapy has a real curative effect. In the case of gangrene it is a complement of the treatment to which the wounded man has a right.

W. A. BRENNAN.

Marquis, E., and Others: Antigangrenous Serotherapy by the Injection of Antibellonensis and Antivibrion-Septic Sera (La sérothérapie antigangreneuse par les injections de sérum antibellonensis et antivibrion septique). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 1522.

As a preventive against gangrene the authors treated 7 cases of multiple wounds with very extensive destruction of the muscles by injecting 20 ccm. each of the antibellonensis and antivibrion serum into the muscles when operation was done within ten hours after injury. If the operation was later than this, 40 ccm. of each serum were injected. Only one injection was made. No case of gangrene developed.

In 8 clinically infected wounds the dose of each serum varied from 40 to 60 ccm. and was repeated after twelve hours. No case developed gangrene.

In a few cases with vascular lesions the treatment was similar. Although gangrene is frequent when the large trunk vessels are injured, 3 of 4 such patients did not develop gangrene.

As a curative treatment in 10 cases with evident gaseous gangrene, a first intravenous injection of 60 ccm. of antibellonensis and 20 ccm. of antivibrion serum were injected. The dose was repeated six hours later, and where there was an evident improvement, again repeated after twenty-four hours. After this a daily injection of 20 ccm. of each serum was made. Of the 10 cases, 2 died and 8 recovered. It should be stated that in the two failures the second dose had not been administered until twenty-four hours after the first dose.

The authors draw these conclusions:

1. Preventive serotherapy by antibellonensis and antivibrion sera appears to be of real efficacy except in wounds of the larger vessels.

2. Curative serotherapy, though less constant in its results, nevertheless assures recovery in the great majority of cases. But it is only an aid to the necessary surgery,— large excisions or amputations, as may be indicated.

W. A. BRENNAN.

BLOOD

Richet, C., Brodin, P., and Saint-Girons, F.: Effects of Intravenous Injections of Artificial Sera in Hæmorrhagic Animals (Effects des injections intraveineuses, des divers sérums artificiels chez les animaux hémorragiés). *Presse méd.*, Par., 1918, xxvi, 581.

As a preliminary to the effects of sera injections in hæmorrhagic animals, the authors investigated the total quantity of blood in an animal, the quantity lost during a hæmorrhage, and the quantity remaining. They find that the total quantity of blood in a healthy animal varies not only according to the weight but also according to the surface. The mass of the blood is about one-thirteenth the total mass in a dog of 12 kilograms; and about one-sixteenth in a dog above 30 kilograms in weight. The amount of hæmorrhage which determines a fatal result was found from several experiments to be that corresponding to 21.2 per cent of the red corpuscles, or 26.3 per cent of the total blood, being the residual quantity left in the animal.

The authors next studied the effects of injections following hæmorrhages. The sera used were: sugar-saline, pure sugar, pure saline, Locke-Ringer, and calcium chloride. Milk and horse serum solutions were also injected. All experiments were made in dogs.

The tabulated findings show that when a dog after successive bleedings has no more than 21 per cent of his red corpuscles remaining, intravenous injections of different sera can prolong its life, and that the hæmorrhage may even continue until his red corpuscles fall to 5 or even at times 3 per cent.

Of all the sera experimented with, the authors have found the most constantly favorable results from a salt-sugar serum containing: NaCl, 7 per cent; lactose or glucose, 5 per cent. Sodium chloride alone does not maintain the mass of the blood sufficiently.

Locke's serum has been constantly found to be toxic; the authors think its toxicity is due to the sodium bicarbonate, because the toxicity is no longer found when this substance is omitted, and other sera become toxic when it is added.

Like sugar, gum may be associated with sodium chloride. Very concentrated gum sera admirably sustain the blood mass and raise the pressure but they are toxic in strong doses.

A small dose (0.2: 1,000) of chloride of calcium is not inconvenient and has a favorable action. Strong doses (2: 1,000) are clearly toxic.

This refers to the immediate or temporary effects observed. For definite prolonged survival the authors carried out a series of thirty experiments. In these they similarly found that the sugar-salt serum gave the best and least toxic results. The experimental results showed that while the maintenance of heart action and nerve centers is possible with a loss of 95 per cent of the blood, yet they never have been able to obtain complete recovery after hæmorrhages exceeding 70 to 75 per 1,000. After a temporary improvement the animal dies within a period varying from a few to twenty-four hours, showing failure of the nervous system, profuse diarrhœa, rectal tenesmus, etc.

To find whether the nervous system was affected in such cases beyond power of recovery, the authors made a direct transfusion of blood in an animal reduced to extreme collapse. After a few minutes the animal was completely revived. Complete revival is therefore possible but only transfusion can effect it; artificial sera are incapable of doing this.

Blood transfusions made from thirty-six to seventy-two hours after artificial serum infections have generally had unfavorable results.

While a serum therefore is capable of maintaining the action of the heart and the respiratory centers for some hours, it does not assure a definite survival after severe hæmorrhage. In such circumstances blood transfusions alone will save and preserve life.

W. A. BRENNAN.

Hartman, F. W.: New Methods for Blood Transfusion and Serum Therapy. *J. Am. M. Ass.*, 1918, lxxi, 1658.

In the first part of his paper the author describes a one-man apparatus for the transfusion of blood by the citrate method. Briefly, this consists of a glass fruit jar, in which is suspended a four-ounce bottle by forcing it through a hole in the rubber cork of the fruit jar. The bottle contains the citrate solution. The fruit jar is a closed chamber, and negative or positive tension may be created by means of a reversible pump.

A No. 17 platinum needle is used, and to prevent clotting the citrate is fused with the blood as it leaves the needle. The rate of citration is controlled by a bulb and dropper arrangement in the citrate tube, regulated by means of a clamp. When the blood is collected, the needle is changed, the pump reversed, and the blood injected.

The author used the same apparatus for obtaining blood serum for therapeutic purposes during the recent influenza epidemic. The blood was citrated and allowed to sediment. The advantages of the method are that it does away with the large centrifuges required, a small amount of apparatus is needed, little handling of the blood is necessary, and the yield of plasma is larger than is obtained from the centrifuge method.

For the selection of donors, a modification of Lee's method is used. The citrated blood is sedimented, and the supernatant plasma drawn off, evaporated to dryness, and dissolved in a minimum amount of normal salt solution. Filter paper is saturated with the mixture, dried, and then sealed in oiled paper envelopes. The concentration of the serum on the filter paper is such as to cause agglutination visible to the naked eye. No glassware or solutions are necessary for the test.

J. R. BUCHBINDER.

Govaerts, P., Finney, J. M. T., and Tuffier, T.: Symposium on Blood Transfusion. *Arch. de méd. et pharm. mil.*, Par., 1918, lxx, 130, 145, 158.

The following reports on blood transfusion in war surgery were presented to the Fourth Interallied Surgical Congress held at Val-de-Grâce, France, in March, 1918.

Govaerts finds that the indications for transfusion are limited as follows:

1. In the hours immediately following injury, to (a) traumatic shock; (b) superacute infection; and (c) hæmorrhage;

2. In the course of treatment, to (a) posthæmorrhagic and secondary anæmia; (b) infections.

The circulatory asthenia in which men arrive in the few hours after wounding, favored by fatigue, cold, exposure, etc., and accentuated by the traumatism, is generally designated by the term shock; but there are three fundamental factors found in these cases: hæmorrhage, superacute infection, and the traumatic element which is represented by the term "traumatic shock." The latter factor is not necessarily accompanied by hæmorrhage. Experimentally any one of the three factors will produce a fall in the blood-pressure.

The diagnosis of severe hæmorrhage is based on three elements: valuation of the quantity of the blood; arterial pressure; and posthæmorrhagic anæmia. The first is not practicable in the severely wounded; the second may also be due to other conditions than hæmorrhage; the third is a surer basis within limitations.

Govaert's experience teaches him that in the case of limb wounds it can be determined within the first few hours after injury if the resulting hæmorrhage endangers the man's life. If, in the venous blood, the number of red corpuscles is clearly lowered, if it does not exceed 4,000,000 in the first six hours, the prognosis is almost certainly fatal. The injection of serum in such cases is useless and a blood transfusion is formally indicated.

Practice has shown the following to indicate an extremely severe hæmorrhage which calls for immediate transfusion: less than 4,500,000 red corpuscles in the first three hours; less than 4,000,000 red corpuscles in the first eight hours; less than 3,500,000 red corpuscles in the first twelve hours. These figures apply to the usual conditions of young soldiers.

In cases of thoracic and abdominal wounds, transfusion seems logical; but in abdominal wounds the demarcations between the effects of superacute infection and hæmorrhage are not clear and it would appear best to transfuse such cases until more definite indications are obtainable.

If in the early hours following injury the state of collapse is the consequence alone of a superacute infection, gaseous gangrene, for example, transfusion is not indicated.

In pure traumatic shock the results of blood transfusions are not definite; and under the circumstances the practice may be considered as calling for further investigation.

Posthæmorrhagic anæmia of itself does not constitute an indication for transfusion, provided the general and circulatory conditions are satisfactory, because it is ordinarily well borne even if severe. But posthæmorrhagic anemia is often accompanied by complications. There may be reason for a transfusion: (1) if an infection exists which accentuates the anæmia; (2) if there is a severe secondary hæmorrhage; (3) if there is no corpuscle regeneration after ten or fifteen hours. Thus in the course of treatment secondary hæmorrhages, chronic hæmolyzing infections and the failure of corpuscle regeneration constitute indications for blood transfusion.

Govaerts' technique approximates the syringe method of Lindeman. It permits transfusion of 500 ccm. in ten to fifteen minutes. No accidents have been reported from its use on the Belgian war fronts. The usual precautions regarding donor, etc., are observed. The syringe method appears to be the best for avoiding coagulation and dilatation of the right heart.

With regard to results, 12 cases of hæmorrhage non-complicated by infection gave 9 complete successes with ultimate recovery. Infection is the danger most to be feared after transfusion and is the reason why rapid and radical operation is needed.

In cases of traumatic shock with pronounced gas gangrene, blood transfusions were ineffective. In secondary hæmorrhage its effect where tried was decisively satisfactory.

Finney states that the use of citrated blood for transfusion has generally been adopted by the American army. He describes the technique in detail. Donors are classed in four groups according to the agglutinating reaction of their serum and corpuscles as described by Moss.

The technique for determining the class of a donor is fully described, as well as the other qualities which donors must show.

At the front, indications for blood tranfusion are given by acute anæmia due to hæmorrhage.

The differentiation of shock without hæmorrhage is often very difficult; but transfusion is always indicated in cases of shock complicated by acute anæmia.

The complete equipment for practicing blood transfusions is described.

Finney thinks that a special member of the hospital ought to be assigned to the superintendence of transfusion. His duties would be: (a) to provide and classify donors and receptors; (b) to be consulted by the personnel in all matters regarding transfusion and to personally superintend transfusions; (c) to keep records of all transfusion cases and to tabulate results; (d) to act as a clinical and laboratory instructor; and to perform such other duties as may be alloted by the surgeon-in-chief.

Tuffier reviews the circumstances which have changed the opinions of surgeons in regard to blood transfusions since the beginning of the war. In brief, these are the substitution of the indirect for the direct method, including the use of citrated blood and the simplification of technique. Blood is not appreciably modified by the addition of citrate and its introduction into the receptor is generally harmless. Although a few coagulation accidents have been reported, these can be traced to faulty technique and are therefore avoidable.

In making the transfusion, it is absolutely necessary to observe all the rules of vascular surgery. Although alterations in the blood do not show under the form of coagulation, yet there are numerous microscopic alterations capable of causing accidents if this law is not observed, e.g., that the walls of the tube in contact with the endothelium of the vessels be absolutely smooth at all points.

The quantity of blood transfused, generally about 500 ccm., is an arbitrary quantity, and more exactitude on this point is needed. This might be obtained from the study of many cases. From 500 ccm. to 1 liter is about the quantity of blood usually lost in severe anæmic cases arriving at the ambulances.

Tuffier knows of no case in which a transfusion has remedied the effects of pure traumatic shock.

In multiple wound cases transfusions have given much success where the principal indication was hæmorrhage and shock secondary to it; failures were registered where the shock was considerable and the hæmorrhage little or nothing.

Published reports give about 67 per cent of success for transfusions; 40 per cent definite recovery, and 27 per cent with varying degrees of survival.

The indications and results are shown in the following table: severe hæmorrhage, 77.7 per cent success; hæmorrhage and shock, 63.3 per cent success; pure shock, unsuccessful; infections, 54.5 per cent success.

In the discussion of the papers the following points were brought out:

Transfusion ought to be limited to shock caused by hæmorrhage.

There is practically very little risk of coagulation by using syringes.

When a repeated transfusion is called for, 50 per cent of the first amount suffices.

Results with old preserved blood (up to twenty-six days) are as good as with recently drawn blood.

At the advanced posts where transfusion is mostly called for, the use of preserved blood is best, even if it should not have all the physiological properties of fresh blood.

No matter what method has been employed, transfusion is followed by hæmolysis if there has been agglutination. W. A. BRENNAN.

BLOOD AND LYMPH VESSELS

Goyanes, J.: Catheterization of Arteries and Veins (Sobre et cateterismo de las arterias y de las venas). *Siglo méd.*, Madrid, 1918, lxv, 893.

The experimental study of catheterization of arteries and veins, the author states, was begun by Bleichroeder and Unger in 1912. They used ordinary urethral catheters marked off according to the length. The method has been used by surgeons in the treatment of vascular thrombi in amputations for gangrene to aspirate arteries and veins. Such a catheter may be introduced laterally into a large vessel or through a collateral branch vessel. When the direction of ingress of the catheter is centripetal, the valves of veins do not offer any opposition and the experiment has been carried out in human subjects without any unfavorable results.

The primary objection to this, i.e., the possible production of thrombosis, owing to the presence of a foreign body within the vessel lumen, does not bear weight since it is well known that thrombosis does not occur from this cause.

The method opens up new vistas of investigation in the clinical field, as well as opportunity for experimental study. Experimentally the pressure in deeply situated vessels can be studied, also certain metabolic problems.

Among the various clinical applications of catheterization, the author refers to three: (1) direct introduction of medicaments into vessels in order to effect therapeutic action upon determinate focal lesions; (2) for direct vascular anæsthesia; and (3) for arterial obturation, especially of the large arteries, in order to obtain operative ischæmia. The author a few years ago published an article on chemotheraphy by the arterial route in the treatment of articular tuberculosis. He has recently employed it in a case of very severe puerperal infection, introducing collargol by a catheter into a collateral of the femoral artery in Scarpa's triangle.

The most important application of catheterization is, however, according to the author, the obtaining of ischæmia during important operations and obviating obliteration by compression. In interilio-abdominal disarticulation, ligatures do not prevent hæmorrhage from the gluteal, ischiatic, and pedal arteries; aortal compression is not convenient. There is thus a field for catheterization.

In a clinical case which the author describes, he tried this method after previous animal experiments. The case was one of enormous osteosarcoma in the right lower limb, and the method used to avoid hæmorrhage was as follows: The catheter armed with a condom at its point was introduced into the femoral artery. At its external end was a metallic piece by which it was connected with a syringe. The catheter was pushed in until it reached the aorta which could be determined by the graduated divisions marked on it. Then through the syringe the condom at the upper extremity was inflated with salt solution through the syringe. This exercised strong pressure and all pulsation in the left limb ceased. This method of conducting the operation bloodlessly was shown to be quite possible, and it was carried out without trouble. Unfortunately the patient's condition was such that he could not withstand the operation and he died ten hours later. W. A. BRENNAN.

Giuseppe, M.: Popliteal Arteriovenous Aneurism; Radical Surgical Treatment (Aneurisma arterovenosa del poplite; contributo chirurgicoal la cura radicale). *Riforma med.*, Napoli, 1918, xxxiv, 631.

Giuseppe treated a popliteal arteriovenous aneurism in a soldier by quadruple ligature and extirpation of the sac, and obtained a perfect recovery. He sketches the recent history of the surgical treatment of aneurisms and thinks that surgeons have only resorted to extirpation when it was impossible to re-establish the permeability of the vessels by suture.

Statistics show that extirpation has usually been followed by good results, while suture and indirect methods are frequently followed by disaster.

Delbet and Mocquot up to 1889 found that aneurisms treated other than by extirpation of the sac gave 22 per cent recovery, 45.4 per cent recurrence, 45 per cent gangrene, and 12 per cent secondary hæmorrhage. More recently Monod and Vanverts in 18 collected cases which had been treated by similar methods found 38.8 per cent recoveries, 11 per cent recurrence, and 27 per cent gangrene.

Since surgeons have followed the indications of radically treating aneurisms like any common tumor, the method of extirpation has obtained its proper place, and only in special circumstances is suture indicated. W. A. BRENNAN.

POISONS

Quarella, B., and Venturelli, G.: Researches on Pus; Pyoculture and Tryptic Reaction (Ricerche sul pus: piocultura e reazione triptica; studio clinico e richerche di laboratorio). *Gior. d. r. Accad. di med.*, Torino, 1918, lxxxi, 64.

The authors were appointed by the Italian Government to make a special study of the treat-

ment of war wounds; they give the report of their findings, based on a review of the literature and their own investigations. Pyoculture they consider to have scarcely enough value to rank as a guide to the surgeon with regard to the time of operation.

While a negative pyoculture generally indicates a benign prognosis, the inverse is not always true that a positive culture signifies a grave prognosis and indicates surgical operation. The authors adopt Fiessinger's dictum that the method can give interesting results but that the mathematical equation must be accepted with some distrust.

The results of a series of pyocultures strengthen the clinical examination when they are in accord; but can never be substituted for it; and can never have, as Delbet claims, a superior value.

Pyoculture can give some important information of a secondary nature. It gives better evidence of the micro-organisms of a wound and indicates the principal infecting agent, which is of value in connection with vaccines; and it serves as a comparative criterion of the importance and use of particular methods of treatment of infected wounds.

With regard to Delbet's further claim that in the case of multiple wounds pyoculture shows which lesion really exposes the patient to the most danger, the authors think that pyoculture can only do this when its results are not influenced by the bad general condition of the patient.

Delbet claimed that pyoculture furnished a new method of giving definite evidence of the evolution of a wound, and was consequently a guide to the relative therapeutic indications.

While pyoculture is founded on the progressive immunization of an organism by the bactericidal qualities of its leucocytes and plasma, yet from the evidence collected by the authors, it has not the practical importance which Delbet and his disciples attribute to it, its indications having only a relative value.

W. A. BRENNAN.

Fioravanti, L.: Etiology of the Gaseous and Non-Gaseous Gangrenous Infections of War Wounds (Contributo all etiologia dell'infezione putrida gassosa e non gassosa delle ferite di guerre). *Policlin.*, Roma, 1918, xxv, sez. chir., 313.

Fioravanti says that there is a pathological, clinical, and etiological distinction between the gaseous and non-gaseous putrid infections of war wounds. The gaseous infections are of anaerobic origin, the non-gaseous are aerobic.

An etiologic differentiation between the different gaseous putrid infections is not possible, because in the initial stages all show identical gas gangrene alterations in the tissues, although varying in gravity and extent according to the agent.

Some gangrenous infections, which may be termed pseudo-gaseous, may be distinguished from the true gaseous infections in which the production of gas is primary and directly in accordance with the activity of the anaerobic microbes. In some pseudo-types the production of gas is not necessarily a direct consequence of the infection but is the product of the decomposing action of microbes. Gas gangrene is the product of strictly anaerobic germs, most frequently the septic vibrion and bacillus perfringens, bacillus protens, bacillus coli, etc. The etiologic importance of these first two microbes has been established from biological researches and the results of subcutaneous inoculations and cultures in animals.

The bacillus proteus is a constant agent of non-gaseous gangrenous infections. The virulence of this microbe has been established by biological researches. The association of the bacillus coli, bacillus subtilis, etc., has a greater clinical than pathological importance. The character and especially the evolution of the non-gaseous gangrenous infections may be aggravated by the streptococcus which, owing to its greater virulence, may cause an extraordinarily rapid and severe development of the infection.

The agglutinating action of the blood serum of the wounded is constantly negative for all infective germs in gaseous and non-gaseous gangrenous infections. This may be due to the difficult absorption of antibodies by the production of agglutinin by the altered tissues of the gangrenous wounds.

Positive agglutinating reactions of the blood serum on microbes isolated from the purulent secretions of wounds no longer gangrenous and in process of repair is to be explained by the absorption of antibodies generated by the wounded tissues.

The author's conclusions are based on a large number of cases observed in the Italian military hospitals, the clinical details of which he gives and discusses.

W. A. BRENNAN.

SURGICAL DIAGNOSIS, PATHOLOGY, AND THERAPEUTICS

Fowler, W. F.: Surgical Diagnosis. *Med. Press*, 1918, cvi, 479.

In this paper Fowler discusses the various phases of surgical diagnosis, in an endeavor to determine who is best qualified, in each instance, to recognize such pathology, and having recognized it, whether further diagnostic effort is essential.

The term "diagnosis" should be broad enough to include not only a recognition of the lesion itself, but also the effects of such lesion. For example, in fractured skull the examination of the eye-grounds will indicate whether or not intracranial pressure is increasing, and whether or not to operate.

Mistakes in diagnosis are more frequent in chronic conditions than in acute ones. The author illustrates his point by citing a case of flatulent dyspepsia, in which the distress came on immediately or soon after eating. There was no tenderness over the appendix nor any history of attacks, and the symptomatology was not suggestive of ulcer. The flatulent dyspepsia was of the type encountered in gall-bladder disease, and although there had been no history of gall-bladder disturbance, the surgeon

considered the probability of cholecystitis. The internist, on the other hand, made a diagnosis of functional gastric disorder, which proved to be correct, and the case subsequently improved under dietetic measures.

The author calls attention to the increase in diagnostic ability gained by the internist from watching the operations, and thinks that the internist should spend more time in the operating room.

The surgical significance of pain is predominant, and therefore prone to over-accentuation. Its reflex and referred nature is recognized, but may be misinterpreted and lead to erroneous diagnosis if relied upon exclusively. Fowler quotes Elsberg's report of several cases operated upon for appendicitis or ovaritis without relief, in which the lesion was a tumor of the cord pressing upon the nerve roots.

He lays stress on the danger of doing pelvic operations in cases where pain is the principal symptom, because the degree of severity is so frequently over-estimated by the patient.

The only way to avoid errors in diagnosis in doubtful cases is to have the co-operation of the neurologist, the internist, the physiologist, the pathologist, the roentgenologist, and the surgeon. In other words, group diagnosis is the remedy for minimizing diagnostic errors. Unfortunately this is not always possible, because an extremely large class of patients are neither rich enough nor poor enough to enjoy the full benefits of such a plan. Birtch has suggested a solution of this by establishing a diagnostic clinic in which individual examinations are made by staff specialists, with subsequent consultation of all examiners, including the family doctor who referred the patient, for a moderate fee.

In a hospital service each ward case should receive a routine examination some time during his hospital stay from each attending staff specialist. It is unscientific and unfair both to the patient and to the surgeon to charge the latter with the sole responsibility for the diagnosis and treatment of some surgical lesion which may be only one of several factors contributing to the patient's ill health. On the other hand, the surgeon cannot shift the responsibility for undertaking a surgical procedure to the shoulders of a colleague. The recent evolution of specialization with the consequent refinement of diagnostic methods has relegated the diagnostic activities of the surgeon to a position of secondary importance, but it has not eliminated him from the scheme of diagnostic team work. G. W. Hochrein.

EXPERIMENTAL SURGERY AND SURGICAL ANATOMY

Loeb, L.: An Analysis of the Behavior of Organs After Transplantation in the Rat; and of the Power of Resistance of the Constituents of the Various Organs. *J. Med. Research*, 1918, xxxix, 189.

In a preceding paper Loeb has already considered syngenesioplastic transplantation of tissues in the rat, and the result of the transplantation as depending upon the relationship between donor and host. He used this method as a means of inquiry into the character of the individuality-differential and the mode of inheritance of the latter. Subsequently he analyzed the factors which lead to the ultimate destruction of tissues after syngenesiotransplantation in the guinea-pig.

In the author's studies in the rat he made use of the simultaneous transplantation of a number of different tissues in the same host. This offered an opportunity to study more closely the general factors which determine the life of various grafted tissues and the behavior of the various tissue constituents after transplantation. In this paper he reports connectedly upon the transplantation of the different organs in the rat; and on the basis of these observations draws some general conclusions.

His experiments were made on the skin, the ovary, uterus, kidney, spleen, liver, testicle, fat tissue and lymphocytes.

From the above experiments the author made the following general conclusions:

Outer and inner factors determine the fate of the transplanted tissue. The outer factors consist of conditions in the environment, especially the character of the host tissue. Age, pregnancy, and the presence of immune substances are of this kind. The inner factors, may be, as investigations show, again divided into: (a) those depending upon the degree of differentiation of tissues and the sensitiveness of the tissues caused by the complexity of structure; and (b) those depending only in an indirect manner upon the structure of the tissue. The fate of the transplanted skin is to a great extent determined by the second kind of factor. Thus it was found that sooner or later transplanted skin is liable to perish, notwithstanding the fact that epidermis is not a very highly differentiated and sensitive tissue, because under certain conditions the connective tissue, in consequence of more or less accidental factors, is made to invade the cyst; and in the ensuing struggle between tissues the connective tissue proves to be the stronger one. It is possible that occasionally the pressure of the keratin which fills the epidermal cyst may contribute to the destruction of the skin.

Variations are found in the state of preservation after homotransplantation in different individuals. Occasionally pieces behave after homotransplantation in a way which is characteristic of syngenesiotransplantation. At present the possibility must be admitted that in such cases the donor and host had after all been related to each other, so that in reality it was not a homotransplantation but a more distant syngenesiotransplantation. There exists, however, the possibility that in certain rare cases animals not related may possess individuality-differentials which are similar to each other. The individuality-differential is the factor which most frequently determines the success or lack of success in the transplantation and the intensity of the lymphocytic reaction.

There exists within the same organ a gradation of different constituents according to their resistance to the injury of the act of transplantation as such and to the injurious influence of syngenesio- and homotoxins. On the whole, the latter agencies do not seem to act in a manner very different from the effect of other injurious influences like X-ray, starvation, ovulation, and interference with the circulation. Thus he found that during ovulation in the guinea-pig ovary all but the smallest follicles perish. These are the most resistant. It is the same in cases of underfeeding. Similarly after transplantation the small follicles are most resistant.

It has previously been observed by Ribbert and others that after transplantation of glands the excretory ducts are more resistant than the functionating gland cells. Investigations show that through comparative auto-, syngenesio-, and homotransplantation of different organs into the same individual, it is possible to establish a quantitative gradation in the resistance of different structures.

The megakaryocytes of the spleen and liver cells survive in slightly more than one-third of those cases in which living spleen tissue or bile-ducts are found preserved. In a similar percentage of cases the small follicles develop to medium or large size in the transplanted rat ovary. Of a similar order is presumably the figure for the preservation of the myxoid or predeciduomatous connective tissue of the uterus, although he cannot in the latter case present any definite figures. All those tissues are preserved only in such cases in which also the more resistant tissues of the corresponding organs are in a good condition and perhaps proliferating. Small follicles of the ovary, bile-ducts in the transplanted liver and endothelia and blood cells of the spleen, are in these cases preserved in approximately one-half or slightly more of all animals used. The power of resistance of all these tissues seems to be of a similar order. The simple glandular ducts, as found in the testicle, ovary, kidney, are most resistant, the more so the more they approach the epidermis and assume the character of the latter.

We see, then, that on the whole the simpler structures survive after transplantation. The transplantation represents, in some respects, a struggle for existence between tissues, and this struggle leads to a selection of the more resistant tissues. This selective action is mainly responsible for the ultimate structure of transplants.

In other cases a similar simplification of structure in the transplants may be produced through a transformation of a complex structure into a simpler one. This seems to take place in the course of the transplantation of certain tumors; this was observed in the case of the transplantation of an adenocarcinoma of a waltzing mouse. In this case the simplification seems to go hand in hand with an increase in proliferative power. The stimuli leading to a rapid cell multiplication do not permit a further differentiation of the tissues. In some respects the simpler structures are comparable to the smaller follicles and the more differentiated ones to the larger follicles in the ovary. However, while the simplified tissue elements in cancer produce a similar kind, the small follicles of the ovary do not produce their like.

The second mode of the simplification of structure carries with it some features of an adaptive process. Those structures develop under the relatively adverse conditions under which the transplanted organ lives, which are best able to resist the adverse conditions under which they originated. Rapidly growing cancers whose elements usually possess a simpler morphological character may from this point of view be considered as well-adapted structures, the adaptive changes having been brought about exactly by those proliferative stimuli which were responsible for the origin of the cancer.

Following the transplantation of tissues, cell-complexes are frequently passively pushed into the transplanted piece from the outside as the result of mechanical pressure and absorption of fibroblasts carrying other cells along with them. Thus a factor is introduced which complicates the analysis of the condition in the transplant.

The rapidity in the absorption and organization of the necrotic material after transplantation of various tissues differs very much in accordance with the consistency of these tissues. In blood-clots, thyroid and spleen, the absorption is relatively rapid, while in the liver, and still more so in the kidney, it is very slow. Giant cells take an active part in the absorption of the necrotic material which they seem to substitute. They play a rôle toward fibrin and necrotic tissue similar to that of the osteoclasts in the solution of the bone.

The author concludes after these investigations that it is probable that during the process of organization of necrotic material, factors are introduced which tend to limit the rapidity of the organization at an increasing rate. This would tend to make the organization within a certain range a self-limiting process. GEORGE E. BEILBY.

Nageotte, J., and Sencert, L.: Surgical Repair of Certain Tissues by Grafts of Dead Tissue (De la réparation chirurgicale de certains tissues par des greffes de tissus morts). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 1546.

About a year ago Nageotte showed that dead tissue grafts, such as tendons, aponeurosis, and enveloping membranes, are entirely revivified after a few days by the immigration of new cells and the re-establishment of circulation by a new-formed vascular network. This referred only to sections of such tissue placed in the organism. For the past eight months the authors have made a number of similar animal experiments, grafting fragments of dead organs in the place of identical fragments removed from the same organs in living animals. Thus in a dog they have grafted about 2.5 cm. of the common extensor tendon of the right anterior paw. The same experiment was repeated in another dog. Both dogs were killed later and examination showed that the

operated tendon in no way differed from the corresponding tendon in the opposite paw, except that the line of suture could be distinguished. There was no peritendinous adhesion. Illustrations of the grafts are given. The original specimen shows that the grafted dead tendon became a living tendon, showing all appreciable morphologic and physiologic attributes.

To study what occurs in the case of these grafts the authors made similar experiments in other dogs which were sacrificed at short intervals. The grafts taken from the living animal are always preserved for a long time in alcohol before use. It appears to the authors that after removal by phygocytosis of all tendon cells which the alcohol has killed, new fibroblasts and new tendon cells have invaded the graft in its new situation, while there is a complete merging of the connective substance of the graft and tendon, so that every trace of union disappears. By the end of three months the vascular network has been reconstituted and does not differ from normal tendon. Thus, as the connective substances of the graft, the essential element of tendon tissue, have persisted, and not any tissue which has been substituted for it, the authors feel it is correct to say that the tissue which actually fills the loss of substance in the tendon is living; but that it is the dead graft which lives again.

The authors have made a number of experiments on dogs also with pieces of the primary carotid replacing similar pieces previously removed. They have not lost a single dog. By patience they have succeeded in showing the first complete successful graft of dead carotid tissue. Not only did the graft, deprived of its living endothelium at the beginning, revivify and amalgamate with the vessel, but the circulation was not hindered. W. A. BRENNAN.

ROENTGENOLOGY

Boggs, R. H.: Comparative Value of Radium and Roentgen Radiation. *Am. J. M. Sc.*, 1918, clvi, 690.

The author takes issue with those who contend that the radiation from the roentgen tube is similar to that of the radium emanations. There is both a physical difference and also a difference in their physiologic action on diseased and healthy tissue. The author also disagrees with those who claim that the roentgen ray will accomplish all that can be accomplished with radium, and with those who claim that radium will do all that can be accomplished with the roentgen rays. It is the author's opinion that the difference in the physiologic action between radium and the roentgen rays may be due to radium giving off β rays and that the γ rays from radio-active substances set up more intense secondary or β rays than from a roentgen tube.

Clinically, while both produce a destructive inflammation, in sufficient dosage, recovery occurs from a reaction of much greater degree from radium than from that produced by the roentgen rays. Therefore radium can be used therapeutically to better advantage where a low grade destructive action is desired. This explains why radium is superior in the treatment of cancer of the uterus and rectum, epithelioma of the lip, mouth, throat, eyelids, or lesions situated on the mucous membrane, as well as its ease of application in cavities. On the other hand, the roentgen rays are indicated where large areas are to be treated.

The author considers the radium exposures much more efficient than the roentgen rays in the treatment of vascular nevi because with radium there is a much greater reaction in the endothelial cells of the small vessels.

The author takes up in detail the technique in treating carcinoma of the uterus, rectum, and breast, and also epitheliomata. In cases of epitheliomata equally good results are obtained with radium and the roentgen rays. In cases of carcinoma of the uterus and rectum, both agencies should be used. In cases of breast carcinoma he considers of greater value the roentgen ray treatment. He constantly emphasizes the necessity for specialized study in treating malignancy, insisting that the radiotherapeutist should know the physiologic characteristics of both agents, and should be perfectly familiar with the cellular pathology as well as the avenues of metastases of the various new-growths, especially the lymphatic system. W. A. EVANS.

GYNECOLOGY

UTERUS

Dorsett, E. L.: Sterility Due to Retrodisplacement of the Uterus; Non-Operative and Operative Treatment. *J. Missouri St. M. Ass.*, 1918, xv, 350.

Dorsett states that retrodisplacement of the uterus alone is not necessarily the cause of gynecological disturbances, but in a large majority of cases is coincident with other lesions in the pelvis. It may however be the cause of sterility. If the retrodisplacement is not associated with any other pathology, it should be treated by non-operative measures, i.e., pessaries and cervical dilatation.

Two important causes of retrodisplacement are traumatism and frequent bladder overdistention.

All cases of sterility should be carefully examined and the exact cause determined before proper treatment is instituted.

Operative procedure in the congenital infantile uterus gives poor results as far as pregnancy is concerned. It is also imperative to ascertain the viability of the spermatozoa in the semen of the husband. The nature of the chemical reaction in the vaginal secretion is also of importance. As a mechanical cause of sterility may be mentioned the position of the cervix against the anterior vaginal wall when the uterus is retroverted, thus preventing the entrance of the semen.

As non-operative methods the author advises Hank's graduated dilators for the cervical stenosis and a properly fitting Hodge pessary for the retroversion. Both should be applied under the most aseptic conditions. He considers curettement in cases of sterility not only worthless but even harmful in some cases by producing a certain amount of traumatism in the endometrium and some disturbance of the deeper uterine tissues with resulting cicatrices and lessened chances of pregnancy.

As to operations, he uses the Dudley operation for the cervical stenosis and atresia of the os uteri, and the modified Gillian for the retroversion, with most successful results. In the latter operation it is important to properly implant the round ligaments into the rectus muscles or their aponeurosis, and not too far above the symphysis pubis. Also the round ligament should be so fastened and drawn through the muscle and fascia that the distal unused segment of the ligament and its uterine origin should both be in contact with the parietal peritoneum.

All operative cases should be carefully examined and followed up after leaving the hospital.

Reports of ten cases of sterility treated by both operative and non-operative methods accompany and illustrate the author's views.

L. R. GOLDSMITH.

ADNEXAL AND PERIUTERINE CONDITIONS

Castano, C. A.: Pathogenesis and Pathology of Phlegmons of the Broad Ligament (Patogenia y anatomia patológica de los flemones del ligamento ancho). *Rev. Univ. de Buenos Aires*, 1918, xv, 219.

Castano brings his extensive article on phlegmons of the broad ligament to a conclusion. It is amply illustrated and accompanied by an extensive bibliography. He made a number of animal experiments. The conclusions arrived at are given:

The experimental results showed that in the guinea pig and rabbit the same infections of the genital tract which occur in women may be observed. These, however, necessitate special conditions during the experiments which have not been known previously: (a) a specific microbe for the animal obtained from its own genital tract, which on cultivation serves for further experiments, giving rise to the required lesions which have a predilection for the place whence taken; (b) the staphylococcus is the best agent for causing infections in animals; (c) it is necessary to traumatize the uterus in order to produce infection; (d) the microbes must not be very virulent, in order to give the lesions time to develop.

Experiments show that there are different routes for infection of the broad ligament; it may occur by direct contagion, by the venous or lymphatic routes, or by contiguity of the tissues.

There is one form of infection of the genital tract provoking lesions which has not yet been described, viz., latent microbism (metritis, parametritis, phlegmons when a determining cause such as traumatism localizes the infection).

In animals injections of human germs, streptococci, staphylococci, bacillicoli or gonococci, produce only attenuated lesions in the uterus and vagina, there being in animals a marked defensive action against uterine and vaginal infections.

During pregnancy and abortion infection takes place with the greatest facility. An infected abortion can be produced in animals with all the lesions which it occasions. Vulvitis, vaginitis, metritis, salpingitis, parametritis, diffuse pelvic cellulitis, and phlegmons of the broad ligaments can all be produced in animals.

The only method of anatomically studying the evolution of phlegmons of the broad ligament is by means of experimental research. It has been possible to follow a series of phases of inflammation of the broad ligament which have never been observed in the human female.

Serous or œdematous parametritis may exist as an anatomic and clinical entity.

Inflammation of the broad ligament occurs in the same form as inflammation of the cellular tissue in any part of the body.

It is not necessary that the peritoneum be attacked in parametritis or in phlegmon of the broad ligament. W. A. BRENNAN.

EXTERNAL GENITALIA

Pallares, J. E.: A Case of Congenital Gynatresia (Ligeras consideraciones sobre un caso de ginatresia congénita). *Siglo méd.*, Madrid, 1918, lxv, 1054.

The author's case of congenital atresia was in a girl aged fifteen years. She had never menstruated. Examination showed a swelling the size of an orange in the right iliac fossa. It could be felt from the symphyses to the umbilicus. Further exploration showed that the hymen was imperforate, bulged outward, and a clear fluctuation could be distinguished there.

A diagnosis of hæmatocolos due to imperforate hymen was made. The imperforate membrane was incised and more than a liter of black thick blood flowed out, followed by a disappearance of the tumor.

By palpation it was found that there were two cavities, a vaginal cavity and a large distended uterine cavity; both were separated by a thin septum, apparently the remnants of the cervix. The tubes were normal.

The author considers the case not only one of imperforate hymen but of atresia of the lower portion of the vagina. Such an occurrence, in accordance with the theory of Nagel and Veit, is not usually due to a suspension of the development of Mueller's ducts, but rather to some adhesive process of unknown origin which causes fusion of the inferior portion of the vagina similar to a fusion produced in any other part of the genital tract. W. A. BRENNAN.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Mosher, G. C.: A Study of Various Cases of Pregnancy Toxæmia. *Am. J. Obst.*, N. Y., 1918, lxxviii, 803.

During the winter and spring of 1918 the author has had under observation 32 cases of pre-eclamptic toxæmia or eclampsia. Since May, 1917, 49 cases have been under treatment, including 6 cases of pernicious vomiting. Why there should have been in the six weeks from January 1 to February 15, 1918, as many such cases as would ordinarily be met in a year is not understood. One can only account for the frequency of toxæmia by charging it either to the extreme changes in climatic conditions; or else to the nervous unrest and tension on account of the war.

Accepting a rational theory of the production of eclampsia, the author has tried to standardize the plan of prophylaxis and treatment as follows:

1. Diet which shall be of non-irritating food.
2. Elimination encouraged by kidney, bowels and skin. Intake and output of fluids is a most important routine and must be shown in a daily consolidated report.
3. All foci of possible infection, tonsils, teeth, kidneys and bowels should be discovered and eradicated.
4. Deep breathing by aiding general circulation and by fresh air avoids danger of asphyxia.
5. Free exhibition of alkali salts and food anticipates acidosis.
6. Veratrum viride is recommended to lower blood-pressure, reduce the pulse, and aid diaphoresis.
7. The emptying of the uterus, as a therapeutic measure, to be done in the way least conducive to shock, is indicated as soon as prophylactic measures fail.

EDWARD L. CORNELL.

Rongy, A. J.: Indications for Cæsarean Section, with a Record of Personal Experiences in a Series of 109 Cases. *Am. J. Obst.*, N. Y., 1918, lxxviii, 840.

The treatment of eclampsia still furnishes ground for prolonged and animated discussions. The pendulum of opinion is swinging to and fro.

Women seized with convulsions after the thirty-sixth week of pregnancy, who are not in labor, whose cervix is thick and long, and who do not respond promptly to medical treatment, should be delivered by cæsarean section. Such patients, if not too toxic, usually recover. The chances for a viable child are also better. Cæsarean section has no place in eclampsia when labor has already set in; in such cases, the administration of large doses of morphine is the best treatment. Cæsarean section has no place in the pre-eclamptic stage, for in these cases the induction of labor is followed by the best results for the mother.

Nine instances of placenta prævia occurred in the series. Seven of the mothers recovered. One of them died of gangrene of the uterine wound, resulting in general sepsis. The other patient also died of sepsis on the sixth day following operation.

The treatment of placenta prævia requires the experience of more judgment than any other obstetric complication, for in no class of patients is the immediate outcome of the case so uncertain.

Cæsarean section was performed in 8 patients in whom forceps delivery had been attempted by the attending physicians. All of these patients were victims of contracted pelvis. Two patients had previous labors terminated by pubiotomy. These two cases, and a number of others clearly demonstrate that pubiotomy does not permanently enlarge the pelvic girdle. If it does, the enlargement is so slight as to be hardly perceptible, a point to be borne in mind.

In two cases fibroid tumors in the lower portion of the uterus prevented the head from passing through. In both a classical cæsarean section was done, and the fibroids were not disturbed. In one case section was performed because of double uterus. In two patients some form of atresia of the cervix existed. Both were primiparæ. One patient, who had a congenital heart lesion, was dangerously ill during the last three months of pregnancy. Interruption of pregnancy was rejected. When labor set in, it was thought best to deliver by cæsarean section. This patient made an uneventful recovery, but died of heart disease three years later. The other cases presented no unusual features. Section was performed because of some deformity of the pelvis, some disproportion between the fœtal head and the pelvis, or some impaction of the presenting part.

A mortality of 7 per cent is not large in a group of patients who were not selected, and who presented almost every obstetric complication.

EDWARD L. CORNELL.

Adair, F. L.: Some Remarks on the Relationship of Syphilis to Abortion, Miscarriage, and Fœtal Abnormalities. *Am. J. Obst.*, N. Y., 1918, lxxviii, 678.

There are reported 1,095 cases, in whom there was a history of 2,773 pregnancies, 2,422 of which ended at term.

There were 109 patients who had 197 abortions in a total of 621 pregnancies, or approximately one abortion to three pregnancies. In the non-syphilitic and negative Wassermann group, there were 83 cases

with 142 abortions in 464 pregnancies, or about one to three. The 13 syphilitic cases had 23 abortions in 74 pregnancies, or about one to three. Apparently syphilis is not a very potent factor in producing the termination of pregnancy during the first trimester.

There were 40 cases with 62 miscarriages in a total of 202 pregnancies, or about one to three. There were 30 cases without evidence of syphilis in whom there were 49 miscarriages in 161 pregnancies, or nearly one in three. In seven cases with indications of lues, there were 10 miscarriages in 27 pregnancies, or a little more than one to three. This indicates that syphilis is not responsible for any high percentage of miscarriages.

In considering the premature births in this series, it is found that about one-third of the mothers gave evidence of syphilis. About 20 per cent of the premature infants give positive evidence of luetic infection. About 10 per cent of the mothers who had stillbirths gave positive Wassermann reactions. Of the stillbirths in the hospital, 12 per cent were proved syphilitic. Two of the malformed infants were born to syphilitic mothers. This is a higher ratio for those with syphilis than for those without.

Syphilis was proved in 2 out of 5 cases of hæmorrhage of the newborn. EDWARD L. CORNELL.

Bugbee, H. G.: Renal Complications of Pregnancy from the Standpoint of the Urologist. *J. Am. M. Ass.*, 1918, lxxi, 1538.

The author calls attention to the important rôle played by the kidneys during pregnancy and makes a strong plea for greater co-operation between obstetrician and urologist.

Bugbee gives the following etiological factors as of importance in rendering the kidneys particularly susceptible to lesions during pregnancy:

1. Since the kidneys are organs of elimination, they are called upon to eliminate the toxins of the fœtus as well as of the mother.

2. The skin is less active than normal, rendering little assistance.

3. The diminished activity of the woman leads to less activity in the organs of metabolism, poor digestion and sluggishness of the bowels, thus increasing the amount of toxic material thrown on the kidneys to eliminate.

4. The increase of toxic products passing through the kidney causes kidney irritation, which leads to congestion, thus producing an important predisposing factor to infections.

5. The lowered resistance of the patient allows focal infections to become more active.

6. Co-existent with the foregoing, more bacteria are thrown into the blood stream, and the kidneys, already congested, are fertile soil for infection.

7. Intra-abdominal pressure mechanically interferes with the normal function of the abdominal viscera.

8. When a pre-existing kidney lesion is added, such as a renal or ureteral anomaly, renal tumor, or malposition of the kidneys, a chronic infection, chronic nephritis, or a calculus, as well as an ureteral lesion interfering with drainage, the urologic aspect of the case becomes most important.

This raises two questions: Should not the kidneys be relieved of the load so far as possible, and how may this be accomplished without a complete examination of the patient and attention to all details of bodily activity?

As a result of his examination of a series of cases, Bugbee found that in 90 per cent of the cases observed the infection was due to the colon bacillus. The bacilli were found on both sides in 75 per cent of the cases, but in all the infection was more severe on one side than on the other. The kidney function was diminished in all.

More than 90 per cent of the cases observed have been acute infections, most marked on one side, occurring during the last three months of pregnancy. The patients were suffering from absorption, high temperature, pain in the side, and urinary symptoms. These patients were all catheterized, given pelvic lavage, and in many the ureteral catheters, one or both, were retained from twenty-four to forty-eight hours. All were relieved and went on to term.

The treatment resolves itself, first, into prophylaxis. Such infections may be prevented by impressing on the obstetrician and general practitioner the important rôle of the kidneys during pregnancy. Any variation from a normal condition should be an indication for a complete urologic examination.

Closer attention should be given to the metabolism of the patient, especially in the intestinal tract, thus eliminating as fast as possible the amount of toxic products of intestinal putrefaction thrown on the kidneys, not by the administration of cathartics, but by exercise, diet, and plenty of fluids. This also means a diminution in the number of bacteria passing through the kidneys. In this connection, the importance of eliminating focal infections, whether oral, nasal, or otherwise, cannot be overestimated.

When a pathologic condition in the urinary tract has been found which might predispose to a kidney infection, it should be eliminated early in pregnancy if possible. Patients as a rule withstand treatment and operation during the early months of gestation with remarkably little reaction. Whether or not a woman should attempt to go through a pregnancy with a renal lesion present, thus subjecting the kidneys to the added strain and possibly infection, is a question to be decided in each case.

Renal anomalies, tumors, calculi, and infections come under this consideration, and some surgical measure, nephrectomy or nephrotomy, may be advisable at once.

In the presence of such lesions, relief of the kidney to the extent of diminishing its load is certainly indicated, and consists of the most careful attention to details.

When a kidney infection is already present, the indications are to give relief from the toxæmia by

establishing drainage, and to cut off the supply of toxins and bacteria. This means kidney drainage with the ureteral catheter, retention of the catheter if necessary, lavage of the kidney pelvis, free fluids by mouth, colonic irrigation, and lastly, urinary antiseptics. If relief is not obtained, termination of the pregnancy is to be considered, and, lastly, some operative procedure, such as drainage of the kidney or nephrectomy, if one kidney is the source and relief cannot otherwise be obtained. Following immediate relief, the patient must have the closest attention during the remainder of the pregnancy to prevent a recurrence of the acute infection. A shifting of the intra-abdominal pressure gained from the knee-chest position is valuable and all other measures noted in prophylaxis are important.

When a patient has passed through the labor, she should be treated as an urologic patient until all damage has been repaired to its fullest extent by treatment or operative procedures. The possibility of future trouble must always be considered and guarded against. J. D. BARNEY.

LABOR AND ITS COMPLICATIONS

Bill, A. H.: Forceps Rotation of the Head in Persistent Occipito-Posterior Positions. *Am. J. Obst.*, N. Y., 1918, lxxviii, 791.

The author has uniformly made use of a method of rotating the head with forceps and has found it a most satisfactory procedure and one which has converted very difficult cases into comparatively simple ones. His experience includes 249 cases in which the head had been rotated with forceps. Of these, 149 were I-para, 77 cases II-para, 17 cases III-para, and 6 cases IV-para.

In 170 cases the position of the vertex was right occipito-posterior, and in 79 cases the position was left occipito-posterior. In 104 cases the head was at the pelvic brim, its greatest diameter not having passed through. In 88 cases the head was in the pelvic cavity above the spines of the ischia, and had not entirely passed through the os. In 43 cases the head was in the pelvic cavity and had passed entirely through the os; and in 14 cases the head was at the pelvic outlet. In 11 of the last 14 cases the occiput had rotated into the hollow of the sacrum, the sagittal suture lying practically in the antero-posterior diameter of the pelvis.

In all cases the head was rotated through the smaller arc with the forceps until the occiput came directly under the symphysis.

EDWARD L. CORNELL.

Cornell, E. L.: Stillbirth Due to Infection. *Illinois M. J.*, 1918, xxxiv, 266.

The author reports this case:

The patient, aged twenty-nine, IV-para, had her last period December 8, 1916. She gave the following history of previous labors: The first, seven years previous, was a breech case, now living; the second, a dead baby, well formed; the third, a six-month's fœtus carried to full term and delivered in a macerated condition.

On June 23, 1917, a diagnosis of a dead fœtus was made. The patient, however, did not complain of any discomfort. In the early part of July, suspecting a case of stillbirth, the patient was subjected to bacteriological study. Aerobic and anaerobic cultures made from the cervical discharge revealed the presence of staphylococci, gram-positive diplococci resembling streptococcus viridans, and diphtheroids. The throat cultures contained streptococcus viridans and occasional staphylococci. The teeth cultures contained streptococcus viridans, staphylococci, and the usual anaerobes, bacillus fusiformis, diphtheroids and streptococci.

The patient went into labor August 17 at 6 p.m. and had a thirteen-hour first stage labor, with the second stage lasting three and one-half hours. The bag of waters was ruptured artificially at 7:30 a.m., August 18. At 11 o'clock a dead fœtus was extracted by craniotomy, as the uterus seemed unable to expel it. The child was badly macerated; it appeared to be a six months' fœtus. The placenta was expelled spontaneously and was intact. The cervix bled sufficiently to necessitate two stitches to control it. The patient did not have a temperature over 99.5° during the puerperium. November 5, 1917, the uterus was found to be in good condition.

The fœtus and placenta were examined, with the following report: placenta, gram-negative bacilli and spore-bearing gram-positive baccilli, probably both saprophytic. The liver contained organisms similar to those found in the placenta. Body fluid: diphtheroids and organisms similar to the above were isolated. No streptococci were found. In the gross examination of this fœtus, no evidences of syphilis and no malformations were present.

X-ray pictures of the patient showed the upper right cuspid, the upper left first molar and the lower left molar involved with apicial infection. The upper left third molar root had not been extracted.

An endeavor was made to grow the various organisms found in the mother, placenta and fœtus through subcultures, especially the diphtheroid group. This was unsuccessful, however, as all of them died out before it was possible to pass them through animals.

Gandolfo, R., and Acampo, A.: Complete Uterine Rupture; Peritonitis; Suture and Drainage; Recovery (Ruptura completa del utero; peritonitis; sutura y drenaje; curación). *Rev. argent. de obst. y ginec.*, Buenos Aires, 1918, ii, 408.

The patient in the author's case was a woman of thirty-six years. Shortly after onset of labor a very sharp pain with a feeling of something giving way was felt in the left side of the abdomen. The pains stopped almost immediately after. The case ultimately came to the authors. There was then intense abdominal meteorism and rapid pulse; intestinal loops were in the vagina, and a laceration could be felt in the left side of the inferior uterine segment.

A dead fœtus was extracted manually; the intestine was reduced and the placenta extracted. The usual signs of peritonitis were present.

A median infra-umbilical laparotomy was done. A large quantity of blood and coagulum was found in the peritoneum; this was swabbed away. The uterus was exteriorized; the extensive tear on the left side, which extended from the tubal insertion down to the cervix, was sutured in two planes; the pouch of Douglas was drained, as well as the vesico-uterine space. The bladder, which was also ruptured, was respected but a permanent catheter was placed. The abdominal wound healed well. After fifteen days the vesicovaginal fistula diminished in size, but it did not cure spontaneously and a further operation was necessary after two months. The patient was in excellent condition after a lapse of three months. W. A. BRENNAN.

PUERPERIUM AND ITS COMPLICATIONS

Potocki: Bacteriology of the Blood in Puerperal Infection (Bactériologie sanguine dans l'infection puerpérale). *Ann. de gynéc. et d'obst.*, Par., 1918, lxxii, 217.

In 196 puerperal cases examined blood culture was positive in 91, i. e., 46.4 per cent. In about 93 per cent of the positive cases a single organism was found, namely, the streptococcus; and only in a few cases were two, three or more associated microbes found. When puerperal fever is present and the blood is sterile, the condition is probably due to the resorption of bacterial toxins.

The author discusses his various findings in detail. He asks whether the results furnished by the bacteriological examination of the blood can be counted upon if in the course of puerperal fever neither the pulse, temperature, the local signs, bacteriologic examinations of the general state, nor the histologic alterations of the blood furnish sufficient evidence for prognosis. It does not seem to the author that at present any more than probabilities can be drawn from the blood findings; nevertheless they strengthen the results found by other procedures. He thinks that the following conclusions can be drawn:

The gravity of the septicæmia is an indication of the rapidity and intensity of the development of microbes in blood cultures, of the number of the microbes, of their hæmolytic properties, and if there is hæmolysis, of the precocity of this hæmolysis.

The presence of microbes in the blood does not necessarily imply a fatal termination of the puerperal infection, but its presence aggravates the prognosis because with it the mortality is 33 per cent, while puerperal mortality is only 8.5 per cent when the blood remains sterile.

When the septicæmia is accompanied by chills, the mortality reaches 62 per cent if the blood contains pathogenic microbes, while it is only 10 per cent if the blood is free.

The streptococcus is the cause of the gravest forms of puerperal septicæmia, whether it exists alone or in association with other germs. But other germs, especially the staphylococcus and gonococcus, which, after the streptococcus, are most frequently met, may cause especially fatal septicæmia.

Treatment based on the employment of appropriate sera and vaccines appears to be the logical method of opposing puerperal infection. The agents employed should be specific for the existing organisms.

In certain cultures of puerperal blood, infinitely small micro-organisms are found which stain only with difficulty. Their presence does not appear to intensify the gravity, but they may favor the development of pathogenic microbes.

The author adds a chapter on the history of the study of micro-organisms in the blood in puerperal infections, referring to Loze and Feltz, two French investigators who reported their researches and findings as far back as 1869. Pasteur's investigations were not published until 1879.

W. A. BRENNAN.

GENITO-URINARY SURGERY

KIDNEY AND URETER

Barney, J. D.: Some Points in the Management of Urinary Calculi. *Internat. J. Surg.*, 1918, xxxi, 389.

The author lays much stress on the large number of mistaken diagnoses in urinary calculi. He finds that out of 290 hospital and private cases 53, or 18 per cent, had had one or more previous operations, mostly (36) on the appendix. These mistakes in diagnosis have been made by skilled surgeons with every faculty at hand for arriving at a correct solution, but in many cases possible measures were not made use of. The fact that one may find a persistently negative urine or X-ray plate in the presence of stone together with slight and atypical symptoms makes the diagnosis a matter of great difficulty in certain instances.

Attention is called to a new point in the diagnosis of ureteral calculi. This is best described in the author's own words:

"In a certain number of cases (now about 20 in all) of stone in the lower ureter, I have observed that when tenderness is present, it is found at its maximum at one point, easily covered by the tip of the index finger, situated one inch below, and at right angles to the center of a line drawn between the umbilicus and the anterior superior spine of the ilium. This point is the hub, as it were, of a wheel of tenderness, the spokes of which radiate for a variable distance. Deep pressure here will almost invariably elicit sharp pain, while equally firm pressure concentrically placed, but a short distance away, produces little or no discomfort.

"While it is true that this phenomenon has been absent in a few cases which were later shown to have a stone in the lower ureter, and while I have also noted its presence in one or two cases where no stone was found, I none the less regard it as a diagnostic point of considerable importance and often the only objective symptom. Furthermore, it has been found more often where the stone was of long residence in the ureter than in cases where the calculus had but recently descended from the kidney, the possible explanation being that in the former event ulceration of the ureteral mucosa had been produced. An investigation in the cadaver of the point described shows that while the ureter may be, and probably often is, directly compressed, a coil of intestine or piece of omentum may sometimes intervene. In any event it is possible that the urine in the distended ureter is compressed into a smaller compass, thus impacting the stone still more, and resulting in still greater distention of the ureter or stretching out areas of ulceration already present. But just why the point described should be that of maximum tenderness I am as yet unprepared to say. While it is true that the finger seems to cause more direct pressure upon the ureter at this point than elsewhere, it would seem as if ever-changing intra-abdominal and always different extra-abdominal conditions would alter the phenomenon described."

Among other observations made in this article are the following:

1. The coating of obscure stones in the renal pelvis with silver salts is of comparatively little value in diagnosis.

2. An ureteral calculus may not produce a scratch upon a wax-tipped catheter.

3. Very small calculi in the lower ureter will generally pass out spontaneously. Owing to the difficulty of recovering them at operation, every palliative measure should first be tried, especially dilatation of the ureter either by a simple ureter catheter or by the scissors through an operating cystoscope.

4. Vesical calculi should be removed by lithotrity and litholapaxy. There are but few contraindications to this procedure and the mortality is much lower than with suprapubic operations.

5. In cases of bilateral renal stone, the better kidney should be operated upon first, or, in favorable cases, both can be done at the same time.

6. Nephrotomy is an operation attended with grave dangers, not only at the time but subsequently. Pyelotomy is the operation of choice and unless it is very clear that the kidney is worth saving, primary nephrectomy is to be preferred to nephrotomy. The crushing of stones within the kidney pelvis and their removal in fragments is theoretically possible but actually is a difficult and unsound procedure in most cases.

7. The frequent passage of calculi from one kidney indicates the presence of an abnormal condition in that organ and this not only can be demonstrated but also can be remedied in most instances.

8. With a calculus pyonephrosis and a stone in the lower ureter on the same side, nephrectomy can be done without interfering wth the ureteral calculus. The latter will produce no further disturbance.

MacGowan, G.: Treatment of Colon Bacillus Infections of the Kidney and Bladder by Surgical Measures Applied to the Ascending Colon. *J. Am. M. Ass.*, 1918, lxxi, 1897.

The author has frequently observed that colon bacillus infection of the kidney and bladder, persisting and unyielding to treatment, is invariably due to colonic stasis of the fæcal current. Stasis usually occurs in the cæcum, and results from immobilization of the organ by adhesions to the surrounding structures. This stasis of the fæcal current in the cæcum supplies a constant stream of colon

bacilli which reach the kidney by way of the lymphatics or blood stream, and results in infection of the kidney pelves when there is any interruption of the free exit of urine, either in the ureter, at the bladder neck, or in the urethra. When once established, the infection remains until the condition in the large bowel is restored to normal by surgical measures. Two cases are reported in considerable detail in support of this view.

Case one concerns a man, aged forty-six years, who complained of prostatic trouble. The urine contained many motile bacilli and pus cells. There was no prostatic infection and no residual urine. A mild cystitis was observed over the bladder base, and poypi were present in the posterior urethra. These latter were removed and the bladder treated daily by lavage with the result that the urine became clear. Colon bacilli subsequently appeared in the urine and again disappeared under lavage treatment. This was repeated several times. Finally the colon was suspected as the basic cause of the trouble. Stasis was found at this point by the X-ray. A laparotomy was done and the cæcum was found bound by adhesions to the ileum and the abdominal wall, and doubled over in such a way as to adhere to the ascending and transverse colon. An elongated appendix with its tip adherent to the liver was removed and the adhesions about the cæcum broken up. Operation was followed by a permanent disappearance of the infection from the urine.

In case two an old stricture was supposed to have been the cause of the infection. But the bacilluria and symptoms remained after full dilatation. Subsequent examination showed a small glandular prostatic nodule within the urethra, together with a median bar. These two conditions were corrected by a suprapubic operation. The symptoms persisted, however, and a bacilluria remained in spite of subsequent local treatment to the bladder and prostatic urethra. Ureteral catheterization at this time showed a colon infection of both kidney pelves. Stasis in the ascending colon was demonstrated with an old adherent appendix attached to the top of the bladder. At operation the ascending colon was found twisted on itself and adherent to the transverse colon. Recovery was slow, but complete. A subsequent perineal prostatectomy was performed to remove a small prostatic lobe still remaining in the opposite side. The final result was a disappearance of all the symptoms and a clear urine free from infection. H. A. FOWLER.

Peterson, A.: The Effect on the Kidney of Ureterovesical Anastomosis; Experimental aud Clinical Report. *J. Am. M. Ass.*, 1918, lxxi, 1885.

A brief historical résumé is given, referring to the published reports of Baker, McArthur, Davenport, Bazy, Franz, and Kronig.

The various techniques of ureteral implantation are then briefly described: the technique of Coffey and Stiles for implantation into the bowel, the recently published technique of ureterovesical anastomosis of Furniss, and the unpublished technique suggested by Mann of the Mayo Clinic.

The author's purpose in making these experimental and clinical observations has been to evolve a technique for the reimplantation of the ureter into the bladder, and to study the effect of such operations on the kidney and bladder. Unilateral implantation was performed on 18 dogs, and bilateral implantation on 3. Coffey's technique was employed in eight cases. Five animals showed an entirely normal kidney and ureter, examined from three weeks to five and one-third months after operation. One animal died from peritonitis on the sixth day. It was possible to make the ureter leak. One death occurred in twenty-four hours; miliary abscesses were found in the kidney. One animal died of distemper on the tenth day; the pelvis and ureter showed a slight hydronephrosis.

Stiles' technique, slightly modified, was employed in eight cases. Care was taken to avoid injury to the ureter, and no suture, except the anchoring suture, was permitted to enter the wall of the ureter. There were six complete successes. In one case the ureter pulled out of the bladder. One case showed advanced hydronephrosis one and one-half months after operation.

Five operations were done with the technique suggested by Mann. In four the results were perfect; one resulted in hydronephrosis four months after operation.

Three operations employing Furniss' technique resulted in complete success.

In reviewing the results in 24 experiments, normal kidneys and ureters were found in 15 instances, slight hydronephrosis in 2, marked hydronephrosis in 1, miliary abscesses in 1 kidney, pyonephrosis in 1, hypertrophied ureter in 2, and the ureter pulled out in 2. Normally functioning kidneys were found in 19 cases (80 per cent). There was complete failure in 5 cases (20 per cent).

In view of the simplicity of the technique and the end-results, the modification of Stiles' technique seems the most suitable in ureterovesical anastomosis. Success depends upon: (1) rigid asepsis; (2) a suitable mechanical scheme to establish waterproof anastomosis without compression of the ureter; (3) avoidance of any suture entering the wall or lumen of the ureter other than the anchoring suture; and (4) avoidance of placing any clamp whatever across the extremity of the ureter.

In 21 cases in the Mayo Clinic the ureter has been transplanted into the bladder, and the effect upon the kidneys has been noted. Implantation was done for a variety of conditions. The results were checked up by cystoscopy, ureteral catheterization, functional tests, and pyelography whenever feasible.

Four patients with carcinoma of the bladder died. In 17 of the 21 cases subsequent examinations were made. In 9 cases (53 per cent) the function of the kidney was entirely normal; fair function in 3 cases (18 per cent), and functionless kidneys in 5 cases

(30 per cent). Deducting those cases in which the ureter was dilated at the time of the operation, and those in which the ureter was implanted under tension, normal kidney function occurred in 75 per cent, and fair function in 25 per cent.

The following conclusions are drawn:

1. From experimental and clinical observations, it is obvious that a normal or almost normal kidney and ureter should result following the implantation of the ureter into the bladder.

2. The utmost care to minimize the operative trauma must be observed.

3. The placing of a forceps over the end of the ureter should be avoided.

4. No suture should enter the wall or lumen of the ureter other than the anchoring suture placed in the split extremity of the ureter; and the approximation of the wall of the bladder must be accomplished without undue compression.

5. When marked dilatation of the ureter has occurred prior to surgical intervention, and when it is necessary to implant the ureter under tension, a successful result is very doubtful and ligation is preferable to any effort of implantation.

The paper is fully illustrated, and detailed case histories are appended. H. A. FOWLER.

Nystrom, G.: Stenosis of the Ureter Caused by Appendicitis (Ein Fall von Ureterstenose durch Appendizitis). *Nord. med. Ark.*, Stockholm, 1918, li, Kirurgi, 109.

In the case of a girl aged seventeen, diagnosed as tuberculous peritonitis with diffuse abdominal pains, operation showed the apex of the appendix strongly adherent in the middle of the edge of the pelvic wall, with the mesentery also loosely adhering. On loosening up the apex, the appearance beneath was like the remnant of an old abscess. Under the unfolded appendix and mesentery and retroperitoneally there appeared a solid greyish tumor the size of the thumb extending from above downward and inward and ending at about the point of fixation of the appendix. On the further side of the tumor a cord extended, the appearance of which corresponded to the ureter.

On proceeding to extirpate the tumor, the author found that it was the ureter with its upper part enormously dilated, the lower thin part being traceable downward into the small pelvis. The transition point between the dilated and normal parts of the ureter corresponded to the point of insertion of the appendix. The ureter was completely stenosed at this place. The operative incision was enlarged and exploration of the upper part of the ureter made to the kidney pelvis. The right kidney was unusually medially placed and only about two-thirds its normal size. After the author had satisfied himself that the left kidney was in every way normal, the right kidney and its thickened ureter were removed, the appendix extirpated, and the area drained. The patient made a good recovery.

Examination showed that the apical end of the appendix was completely obliterated; that the removed kidney was hydronephrotic and atrophied. The ureter was greatly thickened with swollen walls.

Complication of appendicitis by ureteral stenosis appears to be very rare, and the author could find only a few cases reported.

Fenger of Chicago reported such a case in 1896, in which the lower part of the ureter was surrounded by an appendiceal abscess and was compressed by it. The upper part of the ureter had degenerated owing to a hydronephrotic condition of the kidney, and the flow of urine was interrupted. Outside of this case and two others reported by Riese, the author has found no others in which an appendicitis was concerned with an ureteral stenosis. Sprengel's monograph on appendicitis does not mention such a possibility. W. A. BRENNAN.

Herbst, R. H.: Acquired Stricture of the Lower End of the Ureter. *J. Am. M. Ass.*, 1918, lxxi, 1722.

The author summarizes his paper as follows:

1. Strictures of the lower end of the ureter occur more frequently than is commonly believed, and not a few of them are of the inflammatory acquired type.

2. Strictures of this part of the ureter may result from infection spreading from an adjacent seminal vesicle.

3. Strictures in this locality play an important rôle as the etiologic factor in some of the obscure infections of the kidney.

4. The importance of early diagnosis and treatment, before serious changes occur in the kidney, cannot be too strongly emphasized.

In discussing the treatment of ureteral stricture, Herbst describes (with illustrations) his successful use of a hook-shaped knife. J. D. BARNEY.

BLADDER, URETHRA, AND PENIS

Barringer, B. S.: A Very Large Colloid Carcinoma of the Bladder. *Internat. J. Surg.*, 1918, xxxi, 402.

This very unusual case of colloid carcinoma was attached to the abdominal wall and to the bladder. It gave no urinary symptoms and cystoscopically it was seen to indent the bladder wall, which was not in any way changed. The patient was given one dose of radium over the tumor, which had no effect.

The tumor was operated upon and removed and the patient made an excellent recovery. The tumor was diagnosed histologically as a colloid carcinoma of the bladder. V. D. LESPINASSE.

Arquellada: Vesical Calculi in Childhood (Calculos vesicales en la infancia.) *Med. Ibera*, Madrid, 1918, v, 197.

Arquellada's observations are based upon the extraction from young children of 94 vesical calculi, varying from 0.5 to 45 gr. in weight.

The formation of calculi is due either to the pres-

ence of a foreign body, an infarct, or some foreign substance in the bladder.

The symptoms may be divided into three groups: those of presumption, those of probability, and those of certainty. The first group includes pain, urinary incontinence, rectal prolapse, peculiar actions of the child, and the state of the genital organs. The symptoms of probability include intermittent jet during miction, more or less hæmaturia, and alterations in the composition of the urine. The symptoms of certainty are seeing and feeling the calculi.

The author discusses this symptomatology. Spurting of the urine in jets is due to small calculi; incontinence to large calculi.

Symptoms of certainty are to be obtained by catheterization, the use of the cystoscope and the radiograph, the last being the best. In the child it is almost impossible to introduce the cystoscope to the bladder; hence this means is not utilizable. The author thinks also that on account of the manual difficulties catheterization should only be employed when radiography is not available.

Arquellada says there are three methods of surgical treatment for the treatment of bladder calculi in children, namely, lithotrity, perineal section, and hypogastric section. The first method is practically obsolete. Hypogastric section is the method of choice and has been systematically used by the author.

W. A. Brennan.

Nystrom, G.: Repair of an Ureteral Defect by a Plastic Operation on the Bladder Wall (Ersatz eines Ureterdefekts durch Plastik von der Blasenwand). *Nord. med. Ark.*, Stockholm, 1918, li, Kirurgi, 142.

A woman seventy-four years old suffered from a right-sided pyonephrosis due to an extensive tumor in the small pelvis which surrounded the ureter. As a preliminary treatment the pyonephrosis was drained by a lumbar incision and the immediate fear of sepsis removed. A urinary fistula however persisted. To remedy this either the tumor mass could be excised or a nephrectomy might be done. The extent and fixation of the tumor, as well as the patient's age did not permit its extirpation. Also there was doubt as to the functional value of the left kidney, as catheterization of its ureter was impossible owing to a deformity of the bladder by the tumor mass. Nephrectomy of the right kidney was therefore ruled out.

The author decided to try a uretero-neocystostomy. On sectioning the ureter above the tumor it was seen that the ureteral stump was too short to be anastomosed directly with the bladder. Therefore the defect was supplied by a plastic operation made at the expense of the bladder wall, a tongue-shaped strip of this being cut and formed into a tube which was joined by an end-to-end anastomosis with the ureteral stump. The results at first were good. After a month a small fistula appeared at the site of the anastomosis, but this healed up and the patient was discharged. Later on, however, another fistula developed which would not heal. As the author had convinced himself of the satisfactory condition and functioning of the left kidney, a right-sided nephrectomy was done. A probe showed that the ureter was stenosed at the site of the anastomosis.

The patient's general condition was much improved after the removal of the kidney, but she died later from extension of the tumor.

The author thinks that possibly the ureteral operation would have been much more effective if invagination had been done instead of an end-to-end anastomosis. He sketches the various experimental attempts which have been made to remedy ureteral defects by various kinds of implantations and also by free transplantations. He finds that transplants fail. Judging from animal experiments a piece of artery is not suitable; its epithelium apparently becomes damaged by the urine and the inflammation which is observed in the deeper layers would sooner or later cause stenosis if tried in human subjects. Implantation of an ureter into the appendix does not seem suitable owing to the great tendency of the latter to chronic inflammation and obliteration. The use of a resected loop of intestine to replace an ureteral defect appears to be promising. This should not, however, be transplanted in its continuity, but the anastomosis with the ureter done at one end and the other end united directly into the bladder, thus leaving only one place where a stenosis might occur.

Where the defect is not too great, the author believes that his own method of utilizing a strip cut out of the bladder wall itself might be the best solution, but further work along this line must determine the exact value of this procedure. The mucous surface of the bladder would not be affected by urine and the procedure seems physiological.

W. A. Brennan.

Neel, J. C.: Diverticula of the Female Urethra. *Calif. St. J. Med.*, 1918, xvi, 494.

Neel describes a case of a congenital diverticulum of the female urethra which was first noticed in the eighth month of pregnancy. He gives a complete history of the case and four illustrations depicting his method of operative procedure.

The operation was performed under gas and oxygen anæsthesia. A median incision was made through the anterior vaginal mucosa and the underlying fascia to the wall of the diverticulum, then carried backward to expose the neck of the bladder; the diverticulum was then dissected free from the anterior vaginal wall and the internal urethral orifice reduced to normal size with Kelly's mattress sutures of silk. On account of the extensive defect of the posterior urethral wall, complete excision of the diverticulum seemed to be contra-indicated. The walls of the diverticulum were very thin and were readily invaginated into the urethra by two rows of running mattress sutures. The fascia were then separated from the vaginal mucosa and overlapped

after the method of the author. The excessive mucosa was then resected and the cut edges carefully approximated.

The important feature of this case, according to Neel, was the extensive defect of the posterior wall which had undoubtedly extended through the internal urethral orifice during the process of delivery. The recognized treatment in the past has been total excision of the sac; this, however, was usually followed by a urinary fistula, necessitating a second operation as a rule. Excision of the diverticulum in this case would have necessitated the removal of at least one half of the posterior wall, which would have made closure with primary healing extremely doubtful. The contraction of the invaginated walls soon takes place and the imbrication of the overlying fascia gives excellent support without disrupting the urinary tract. LOUIS GROSS.

Mosti, R.: Hypogastric Deviation of the Urine in the Treatment of Urethral Wounds (La derivazione ipogastric dell' orina nel trattamento delle ferite dell' uretra). *Policlin.*, Roma, 1918, xxv, sez. chir., 374.

In more than 4,000 war wounds observed by the author, he has seen the urethra injured in only 8. Such wounds therefore cannot be considered as frequent in war. The evolution of this type is most unfavorably affected when complicated by multiple visceral wounds.

The three most important symptoms upon which a diagnosis can be founded are: ischuria, urethrorrhagia and flow of urine through the wound orifice. With ischuria acute complete retention is frequent. The use of the catheter will also disclose an urethral wound. The indications for operation are two-fold: to remedy urinary retention, and to prevent infection. While the use of a permanent sound accomplishes the first object, in many cases it assists in the spreading of infection; it is a foreign body which can set up an urethritis and aggravate conditions.

The author thinks that an external urethrotomy is the operation of choice to prevent the spread of infection. In the majority of his cases, this, associated with a hypogastric cystotomy, was the procedure followed. The permanent catheter was not used until the area was cleansed and every trace of infection had disappeared. When the wound was judged to be aseptic in the first instance and the perineum intact, a hypogastric cystotomy alone was done. Urethrotomy is however generally indicated under the same conditions that complete surgical cleansing is indicated in other war wounds, viz., when the projectile is likely to be an infecting one, such as a particle of shell or hand grenade, etc.

From his own experience and the results he obtained, the author believes that hypogastric cystostomy is a preliminary treatment of the greatest importance in urethral gunshot wounds; and that in some cases it effects complete recovery from such lesions. In any case it brings about a more speedy recovery. The associated cystotomy and external urethrotomy are indicated when a projectile is retained with retention of urine owing to the constant infection.

Mosti criticizes the views recently put forward by Fullerton in the *British Medical Journal* regarding the treatment of this class of wounds. Fullerton recommended exterior urethrotomy with a suprapubic cystostomy if necessary without a permanent catheter, permitting the urine to freely flow through the perineal incision, in the belief that normal urine was a detergent. To this Mosti finds many objections; apart from the irritation produced after a time, the process of cicatrization is delayed enormously and fistulization will be constant. Fullerton's view that urethrotomy is indicated by the nature of the wound rather than by the presence of retention is criticized by Mosti, who believes that a simple cystotomy alone is called for if the conditions are aseptic and that urethrotomy is indicated only when infection is present or anticipated.

W. A. BRENNAN.

GENITAL ORGANS

Kimura, T.: Transverse Ectopy of the Testis with Masculine Uterus. *Ann. Surg.*, Phila., 1918, lxviii, 420.

According to the author, only ten cases of transverse ectopy of the testis are reported in the literature. A brief summary of these cases is given.

The main features of the author's personal observation follows: A male student, aged twenty years, was admitted with a swelling of the left scrotum. This appeared one month previous and was painless. It now developed rapidly to the size of the fist, was painful, and the overlying skin was reddened. There was nausea, vomiting, loss of appetite, and fever. The clinical features suggested incarcerated hernia.

At operation a curious condition presented. On opening the subcutaneous adipose tissue and fascia, a brown colored tissue, resembling a hernial sac, was discovered. This sac contained some serous fluid and the omentum was adherent to it. Just beneath the adherent omentum was a thick, firm cord which extended down into the scrotum, upward deep in the pelvic cavity, and behind and underneath the bladder. This cord, the spermatic cord and the omentum had grown intimately together.

Pathologic examination showed a thick-walled cyst, two spermatic cords and a cylindrical mass of tissue with a canal which was lined with mucous membrane. When the cyst was opened, two testicles were found. Both testicles were of normal size and appearance. Between them was neither septum nor membrane. Each testis had its own epididymis and normal sized spermatic duct. A canal, the wall of which was 0.5 cm. thick and its lower end terminating in cæcal form, was between the cords. Microscopic examination showed two spermatic cords. The inner surface of the sac which terminated in

cæcal form was lined by one or two layers of cylindrical epithelium with cilia. The structural appearance, microscopically, resembled that of a uterine wall, not that of an intestine or a Meckel's diverticulum.

There are two different points of view respecting the mode of origin of the transverse ectopy of the testis. According to Lenhossék, "The abnormality may depend either on a faulty development of both testicles in one side, or on a faulty descent of the testes, due to the abnormality of the gubernaculum testis." From their own observations Romanovsky and Winiwarter inferred that the right testis must have been either pressed to the left side or taken with the left testis into the open processus vaginalis because of some abnormal connection.

The author believes both views are correct and are supported by the observations upon which they are based. The tissue resembling the uterus in structure is interpreted as a masculine uterus. Its existence is explained as follows: "Originally wolffian ducts and Mueller's ducts run parallel to each other. In the male the former develops continually, while the latter diminishes by degrees after the tenth embryonal week. But if from some cause a part of Mueller's ducts remains behind and develops further, then there may occur a so-called masculine uterus."

H. A. FOWLER.

Watson, E. M.: The Human Seminal Vesicles at Birth. *Ann. Surg.*, Phila., 1918, lxviii, 416.

The basis for this report was obtained from a study in serial sections of the genito-urinary tract of a male fœtus at birth. Every section from the urachus to the anterior uretha was saved for study. In addition a reconstructed enlarged drawing was made from 120 serial sections to give a graphic representation of the outline of the seminal vesicles at this stage.

Each vesicle presents an extremely irregular outline, being composed of numerous outpushings of diverticula of varying depth and diameter. These for the most part are confined to the distal and middle thirds of each organ. The evaginations or outpushings arise not only from the main channel of the vesicle itself but in some instances from other evaginations. On the whole, this picture is one of an almost tree-like growth with the branches of finger-like processes proceding from the middle and distal thirds of each organ and growing for the most part in an upward direction. Each branch or diverticulum ends as a blind pocket, but in every instance its lumen is patent throughout its main cavity and is united with the proximal canal, the vesicle proper, or with another and larger diverticulum.

From this arrangement it is seen that the drainage is in the main downward and follows the natural path of gravitation. With this anatomical picture it is seen that in order to obtain effectual drainage by surgical intervention, multiple incisions are necessary and these for the most part should be along the middle portion of the organ and particularly at the apex or tip of each vesicle where angulation with an anatomical tendency to pocket formation is great.

In addition to the diverticula or finger-like processes mentioned above, there are many cup-like evaginations or depressions which have been termed saccules. These arise from the walls of the various pouches and also from the vesicle itself and add greatly to the irregular and ragged contour of each organ, yet present no added consideration from the standpoint of drainage because of their very shallow character.

A brief résumé of the embryological development of the seminal vesicle is also given.

H. A. FOWLER.

Dillon, J. R.: Seminal Vesiculotomy in the Treatment of Gonorrhœal Rheumatism. *Calif. St. J. Med.*, 1918, xvi, 485.

Dillon gives in detail the histories of ten cases of seminal vesiculotomy; he considers only those cases having frank neisserian histories and arthritic and other systemic manifestations dependent upon focal infections in these organs, which could not be overcome by the usual non-operative methods of treatment.

The author says that when one considers the anatomy and realizes that less than 4 per cent of vesicles have straight tubes, 96 per cent having tubes of varying lengths and capacities due to twists and diverticula, it is understood that the chances of spontaneous cure are very slight and that resolution by natural drainage is mechanically impossible.

The operative results have been most brilliant; the peri-articular lesions improve much more rapidly than do intra-articular lesions. The gonococcus is apparently the original invading micro-organism but it is shortly joined and probably supplanted by a variety of pyogenic micro-organisms. The gonococcus undergoes mutation within the vesicles, depending upon the alterations in the environment and may then show selective tissue affinity. The author states that the vesicle may be only part of the trouble; the prostate and the urethra may be important in the production of local or systemic symptoms, and the results of drainage may be disappointing unless the prostate and urethra receive proper attention.

The seminal vesicles and testes are interdependent and form with the prostate a procreative triad essential to posterity; for this reason, Dillon says, the seminal vesicles should not be totally excised. More satisfactory results can be obtained by slitting the vesicles longitudinally and gently curetting them.

In conclusion the author says:

1. Seminal vesiculotomy appears to be justifiable and indicated in cases of gonorrhœal arthritis which have failed to show a reasonable improvement after the acute and subacute urethral conditions have cleared by the usual methods of treatment.

2. In five cases there was no impairment in the sexual function.

3. The bacteriological etiology was rather indefinite and unsatisfactory.

4. The clinical results of the operation were satisfactory and much appreciated by the patients.

LOUIS GROSS.

Stewart, F.: Prostatectomy. *Illinois M. J.*, 1918, xxxiv, 263.

The paper is devoted to a consideration of the importance of a thorough preparation of the patient for operation, and the necessity for careful and painstaking after-treatment. Emphasis is placed upon the necessity for a careful examination to determine the patient's condition before operation, which serves as a guide as to the character and amount of preliminary preparation required.

The operation is never an emergency one, and should be undertaken only after the patient has been put in the best possible condition by appropriate pre-operative treatment. The author believes in the two-stage operation in all cases as being safer and better for the patient.

The importance of personal supervision of the details of after-treatment is insisted upon. According to the author the great danger is hæmorrhage. This is controlled by packing, or the use of one of the bags devised for this purpose. Appropriate measures to be used in other complications, such as suppression of urine, shock, abdominal distention, etc., are briefly considered.

H. A. FOWLER.

Lowsley, O. S.: Surgical Pathology of the Human Prostate Gland. *Ann. Surg.*, Phila., 1918, lxviii, 399.

Lowsley's work on the prostate gland is so well and favorably known that anything he writes on this subject will be read with interest and profit. The discussion of the surgical pathological conditions of the prostate gland is introduced by a brief review of the embryology and anatomy of the organ. The following surgical conditions are then considered in the order named: acute prostatitis, chronic prostatitis, tuberculosis, syphilis, prostatism, carcinoma, sarcoma, and prostatic calculi.

The article does not lend itself to a detailed abstract, and should be consulted in the original.

H. A. FOWLER.

Gardner, J. A.: The Silent Prostate. *J. Am. M. Ass.*, 1918, lxxi, 1636.

Gardner discusses the various types of obstructing prostate and the symptomatology associated with each.

He points out that the real danger of the obstruction to the outflow of urine lies in the back pressure produced upon the kidneys. These organs are generally infected, either when the patient presents himself for treatment or soon after drainage of the bladder is established. The renal function, at first low, recovers itself after drainage is established. If infection is already present, or if it occurs before prostatectomy, the patient acquires an immunity to further infection which is a factor in his favor.

Gardner lays much stress on the value of the two-stage operation and has had 112 consecutive cases without a death. He goes into the details of his operative procedure.

His method is to have a functional test made when the patient first enters the hospital, and he is guided to a certain extent as to the time of performing the second operation by the improvement in this functional test. The patient who excretes only from 5 to 10 per cent during the first seventy minutes is a poor operative risk. On the other hand, when they excrete from 40 to 50 per cent, they are considered good operative risks. This rule is not hard and fast, however, because patients have been operated upon successfully who excreted but 10 per cent during the first period of seventy minutes.

The test is carried on for two periods of seventy and fifty minutes respectively. The excretion is frequently slow, and the greater portion of the dye may be passed in the second period. The phthalein test is not used as the sole index to the surgical risk, but the general condition of the patient aids in the conclusions. As the patient improves under elimination, sweat baths and bowel washes, and when the urine is scanty by the forcing of fluids, his functional test also improves. Following the primary cystotomy, the functional test frequently makes a marked drop, and then after a day or so begins to rebound again, demonstrating the advantage of dividing the shock into two parts.

It has been Gardner's practice, the day after a patient enters the hospital, to perform the primary suprapubic cystotomy under infiltration anæsthesia with procaine. The patient is given from one-sixth to one-third of a grain of pantopon (pantopium hydrochloricum) an hour before the operation. Because of the necessity of anæsthetizing each layer, the primary operation occupies a longer time than if the patient was under general anæsthesia. But the patient is not suffering from shock, and there is a chance to prepare the tract for the second operation, taking care to open the bladder as high up as possible. At this time the prostate may be examined and cystoscopic findings checked up. A large mushroom catheter is placed in the suprapubic wound for drainage, and a purse-string suture makes a tight joint. The fascia and skin are sewed up in layers.

Two days after the operation, the patient is out of bed. These old men do not do well lying down, and they feel they have made progress because they are able to be up and around. The mornings are occupied with elimination treatment of baths and bowel washes, while during the afternoons the patient is up and walking. As the general constitution improves, incidentally his phenolsulphonephthalein output is improved, and he is prepared for the second operation.

At the time of the second operation, a general anæsthesia of ten minutes suffices to stretch up the

original opening and lift out the adenomatous prostate. The Hagner bag controls the scant hæmorrhage, and a large drainage tube of the Marion type is used in the suprapubic wound. The bag and the tubes are removed at the end of forty-eight hours. The bottle-pump designed by Bethune is then used. The wound is kept dry by this method and heals very rapidly. Usually after a week's use, the opening is so small that the catheter attached to the pump may be removed, and the wound heals spontaneously. An indwelling catheter placed in the urethra for a few days assists the final healing. The patient sits up in bed the second day and is permitted to get out of bed the following day. It requires from three to four weeks for the average suprapubic wound to heal.

One of the very important adjuncts to the treatment of these cases is the service of a good nurse, one who has been thoroughly trained in the care of these patients. They are able to do much to help them, both mentally and physically.

An investigation recently made by Thomas of the operative reports of 26 representative general hospitals in Pennsylvania and the neighboring states, revealed the alarming statistics of 22.5 per cent mortality as the result of 148 prostatectomies made during the year. This is a startling comparison to the mortality rate of 4.33 per cent for 1,375 prostatectomies by eight of the world's foremost genito-urinary surgeons.

Young has reported one series of 128 prostatectomies without a death, and the author has completed a series of 112 unselected cases without a death. This very marked difference in statistics is caused, he thinks, by the attention to detail given by urologists. J. D. BARNEY.

Quinby, W. C.: The Treatment of Genital Tuberculosis in the Male. *J. Am. M. Ass.*, 1918, lxxi, 1790.

The problem of the treatment of this condition is thus tersely stated by the author: "For the successful treatment of any surgical ailment, an exact knowledge of its pathology and mode of invading the various tissues is important. Such exact knowledge is lacking in the case of tuberculosis of the male genitalia, particularly as to the structures primarily involved."

There are two opinions at the present time; the majority hold that the epididymis is the first structure involved; a smaller number believe that the disease begins its genital invasion in the prostate, spreading thence to the vesicles and the epididymis. This question is of much more than mere academic importance, as the eradication of the primary focus is essential to a cure in most cases.

Epididymectomy has been widely employed in accordance with the opinion of the majority. While good results have been obtained, the attempt to cure genital tuberculosis by epididymectomy leaves much to be desired. Keyes is quoted to the effect that relapse on the opposite side almost inevitably occurs. Barney finds the opposite side attacked in over one half the cases within a year or two of involvement of the first side.

These results are difficult to explain if it is assumed that the primary focus is in the epididymis, but are easily explained if the prostate and vesicle are considered the first point of attack.

In what percentage of cases of tuberculosis of the epididymis are the prostate and vesicle involved? Two sources of evidence are available as a basis for an answer: (1) necropsy findings, and (2) clinical examination of the prostate and vesicle. The evidence from these two sources shows that in an overwhelming majority of cases the tuberculosis is found to involve the whole genital tract. The author believes that final conclusive evidence must be found in the "pathology of the living." As a contribution to this solution of the question he details the results obtained in seven cases in which the entire tract was removed on one side, employing the technique described by Young in SURGERY, GYNECOLOGY AND OBSTETRICS, 1918, xxvi, 375. A detailed history of each case is given.

The evidence obtained in this small series of cases is that in no case were the structures central to the epididymis found to be free from tuberculosis. Another interesting case in this connection came under observation in which the tuberculous process was confined to the prostate, the epididymis showing no abnormality.

The average age of these seven patients was twenty-eight years. Four were single and three were married. The duration of the disease from onset to the time of operation averaged about three months, except in one case in which it was two years and nine months. Rectal examination showed the prostate and vesicle involved in two cases; the vesicle only in three cases, while in two the examination was entirely negative. The urine contained pus in three cases; in four it was normal. In no case was renal or bladder involvement demonstrated. Five cases had a discharging sinus in the scrotum before operation.

Six patients were clinically cured. One patient had an extension of the disease to the other epididymis, which was operated upon two months later and cured. The average time since operation is thirteen months. H. A. FOWLER.

MISCELLANEOUS

Keane, W. E.: Extravasation of Urine. *J. Mich. St. M. Soc.*, 1918, xvii, 429.

Because of the destructive ravages caused by extravasation of urine, its very high mortality, and the fact that this condition is not uncommon, Keane reports the histories of a few of his cases and offers some suggestions as to their care.

He says that extravasation of urine does its damage as a rule by pressure and mechanical irritation, which is followed by infection and necrosis and delays the untoward symptoms until sepsis

appears several days or even weeks after the injury, and the original rupture is healed. He cites two cases as examples and suggests that if the patient is seen early and the tear located, repair should be made at once if the urine is clean, but particular care should be excercised to clean out what urine has escaped to the surrounding tissues. Guttapercha drainage should be left in from two to three days. External urethrotomy should be done if the urethra is torn, and an indwelling catheter left in the urethra for three or four days. If the cases are seen late and sepsis is already present, the choice is only for complete drainage of the damaged and gangrenous tissue.

The author says that in some instances there may be no stricture, or the narrowing, if it exists, is very slight. He illustrates this by detailing a case in his service, where the meatus was of the pinpoint variety, yet the extravasation was so extensive and destruction so great that both testicles were exposed.

The author advises that care should be taken to inspect the perineum in all patients who are strictured and have partial retention and who show symptoms of sudden complete retention, accompanied by rapid swelling of the perineum and scrotum.

If resort must be made to suprapubic aspiration, Keane advises the use of a very small calibered needle and followed in a very few hours with a radical operation for drainage of the bladder. He quotes Keyes that timorous incision is the patient's death warrant, and urges that the tissues should be squeezed free of all pus, washed well with 1:5,000 bichloride, and the necrotic tissues cut away at once.

The destroyed scrotum closes completely in a few weeks, without the aid of grafts. The finger should be introduced into any pockets that burrow, and all septic material removed as fully as possible. He dwells upon the necessity of frequent dressings. He uses permanganate of potash 1:5,000 for irrigation, and wet dressings of the same solution, covered with oil silk. LOUIS GROSS.

Kirmisson: Genito-Urinary Tuberculosis in Children (De la tuberculose génito-urinaire des enfants). *Rev. gén. de clin. et de thérap.*, Par., 1918, xxxii, 641.

A boy of fifteen showed hypospadias and ectopic testicle on the left side; on the right side there were all the signs of a tuberculosis of the testicle and epididymis. The boy was operated upon, the suppurated cavity on the right being drained. A few months later the patient again came to the hospital showing an enormous swelling of the left scrotum and inguinal region. The skin was red and adherent and fluctuation was evident. On the right side, previously operated upon, there was a fistula with abundant suppuration. Rectal palpation showed that on the left side the prostate was greatly swollen, as well as the fundus of the bladder. There was in fact an extensive invasion of the genito-urinary region, including the prostate, seminal vesicle, deferent canal, and base of the bladder. Reaction for tuberculosis was positive.

While an ectopic testicle is often considered to be the cause of malignant degeneration, Kirmisson does not think that it can be responsible for the rapid spread of the tuberculosis from the right to the left side in this case.

Genital tuberculosis in the child, while not frequent, cannot be considered as rare. Félizet in his service during ten years found 58 cases. Hutinel in his hospital service in a space of nine months observed 9 cases. Most authors agree that it more usually shows between the ages of five and seven years. In children the lesion is less frequently bilateral than in adults; and the left side is more usually the site. In adults genital tuberculosis is especially epididymal; in children the testicle and epididymis are more usually attacked, but extension to the prostate and seminal vesicles is very rare. Two forms may thus be distinguished; pure genital tuberculosis, and genito-urinary tuberculosis.

The evolution is often acute or superacute. In a general way the prognosis is favorable. There is a tendency to recovery by fibrous transformation, especially in children; but not a few succumb either to pulmonary tuberculosis, meningitis, or peritoneal tuberculosis. This latter may be connected with the persistence of a vaginoperitoneal canal.

In treatment Kirmisson does not approve of castration unless there is almost total destruction of the gland by the suppurative process. Conservative treatment should be tried. This, according to the state of the lesion, may be either compression, puncture of the abscess, with iodoform injections, or the use of the thermocautery. This latter has given good results, but success cannot be expected in all cases.

The actual case reported is a very unusual and unfavorable type, and the prognosis in this case with its persistent vaginoperitoneal canal points to tubercular peritonitis and death. W. A. BRENNAN.

Watson, E. M.: Consideration of the Methods for Demonstrating Tubercle Bacilli in the Urine. *Am. J. M. Sc.*, 1918, clvi, 636.

Watson gives in detail the various procedures for demonstrating tubercle bacilli in the urine and says that the method which requires the fewer laboratory reagents, consumes less time, and gives a higher percentage of positive results is the one which will be used eventually.

His method is as follows:

1. Irrigate the glans penis and urethra with sterile water. This eliminates the smegma bacillus and other extraneous organisms.

2. The patient then voids in three glasses. The last is a conical-shaped sedimenting glass of 250 ccm. capacity and fits in an ordinary high-powered electric centrifuge.

3. The specimen is centrifuged for five minutes at moderate speed. If there is much sediment, 5

ccm. of antiform is added and the specimen is thoroughly stirred for several minutes with a sterile glass rod, until a perfectly homogeneous mass is obtained. If there is very little sediment, it is not advisable to use antiform. Some definite macroscopic sediment is highly desirable, for it acts as a fixative and facilitates focusing in searching for organisms.

4. The entire specimen is then subjected to a second centrifugalization at high speed for thirty to forty-five minutes.

5. The supernatent urine is then decanted and the sediment at the bottom or apex of the cone is used for preparing three glass slides.

6. The slides are allowed to dry in the air and fixed in a Bunsen flame.

7. If the smears appear thick to the eye, the slides are placed in 5 per cent acid (HCl) alcohol for two minutes. This procedure dissolves the urinary salts, which, if stained by the fuchsin, are often confusing, after which they are again fixed in the Bunsen flame.

8. The slides are then stained in carbol-fuchsin for ten minutes. The entire slide is submerged in the stain and heat is applied until the solution steams. The slides are then washed in running water and placed in 2 per cent acid (HCl) alcohol until completely decolorized. They are then counterstained in Loeffler's methylene blue.

The author mentions an important point suggested by Churchman, that if negative results are obtained in a specimen from a suspected case of vesical tuberculosis, a thorough irrigation of the bladder with moderate distention and careful examination of the bladder washings should be carried out. An ulcer in the vertex or high on the anterior wall may thus shed organisms into the irrigating fluid, when the urine is negative.

If these methods yield no results, resort may be had to animal experimentation. By mechanically injuring the inguinal lymph-glands in guinea-pigs previous to inoculation and then injecting 1 ccm. of urine subcutaneously in the inguinal region, the time can be reduced to from nine to eleven days. Morton reduces the time of demonstration of tubercular lesions by inoculation of roentgen-rayed guinea-pigs.

Notwithstanding the use of all laboratory methods, Watson says it is not always possible to demonstrate the presence of tubercle bacilli. The guinea-pig test is not infallible, and occasionally the organisms may be demonstrated by centrifugalization and staining when the guinea-pig test is negative.

LOUIS GROSS.

SURGERY OF THE EYE AND EAR

EYE

Davis, A. E.: Report of Two Orbital Tumors. *Am. J. Ophth.*, 1918, i, 828.

Case 1 was an endothelioma affecting the orbit and frontal bone. The swelling was of bone-like hardness and extended over the right eye from orbit to hair line.

Through an incision just below the rim of the orbit the lacrymal gland and part of the roof of the orbit were removed, pathologic examination showing the tissue to be an endothelioma. A week later the roof of the orbit and 1½ inches of the frontal bone together with the meninges were removed.

There is no sign of brain hernia; there is symmetry of the two sides, and the patient has no ill effects from his operations. Vision is right 20/30, left 20/20, as before operation.

Case 2 was a recurring tumor of the optic nerve originally removed at the age of eight by the Kronlein procedure, the diagnosis being spindle-celled sarcoma. Seven years later prominence of the eye again occurred and an exenteration of the orbit was done. The tumor was found to be a myxoglioma. It is an interesting point in this case that the retinal circulation was maintained in the eye after the first operation and that a glioma should succeed a sarcoma.

S. S. Howe.

Jackson, E.: Permanent Vascular Changes Following Injuries to the Eye. *Am. J. Ophth.*, 1918, iii, 776.

Three cases of severe injury to the eye are reported, the nutrition remaining good, however, and there being no obstacle to ophthalmoscopic study of the late results.

Case 1 was struck in the right eye by a chip of wood thirty-nine years previously. The optic disc was grayish white, devoid of small vessels, and the whole central region of the choroid showed complete absence of retinal pigment and choriocapillaries. The striking thing was the almost complete disappearance of the retinal and choroidal vessels, with absence of evidence of serious intra-ocular inflammation.

The condition seems best explained by the hypothesis of injury to the vessels back of the eyeball causing complete thrombotic obstruction in the area of distribution of the posterior ciliary arteries with preservation of the circulation of the anterior ciliaries.

In similar cases almost invariably this condition has been confined to quite limited portions of the fundus, and no case of such extensive vascular change with so little evidence of other disease in the eye following trauma seems to have been recorded.

Case 2 had been injured by a pointed stick at the age of seven and presented evidences of choroidal sclerosis in small areas and obliteration of some vessels. White streaks existed behind the retinal vessels such as would be likely to follow extensive hæmorrhage, and with them were associated massings and atrophies that pointed to inflammatory reaction.

In case 3 the eye had been torn out of the socket but replaced. The region of the optic disc was occupied by an oval bluish white area with brownish black pigment splotches around the margin, and to the temporal side of the disc was a crescentic area presenting the usual appearances of rupture of the choroid. This must be regarded as an avulsion of the optic nerve, partial or complete, and the author discusses this condition, dividing the cases into two groups, those in which injury and hæmorrhage have been so great as to preclude ophthalmoscopic examination, and a smaller group in which examination was possible.

Similar cases are cited and the conditions described are illustrated in a colored plate.

S. S. Howe.

Ewing, A. E.: Postciliary Scleral Trephining for Acute Glaucoma. *J. Am. M. Ass.*, 1918, lxxi, 1967.

The author describes in detail his treatment in a case of glaucoma in a woman aged fifty-seven by postciliary scleral trephining, stating that the material is offered only as a study in the intricate problem of glaucoma.

The history of the case begins July 18, 1917, with tension in the eye 57, vision 8:150, and the usual findings in glaucoma. July 25 there was no evidence of permanent improvement through therapeutic measures which were effective in clearing the cornea and media.

A postciliary scleral trephining was performed, and a second trephining also postciliary, each of which were followed by secondary operations for removal of scar formation within the trephined wound and other procedures to establish drainage by the postciliary route.

The following results, on which the author comments, are quoted from the original article:

1. The removal of vitreous in such quantity that the tension of the eye is brought far below normal is no more a cure for glaucoma than is the removal of the lens.

2. Drainage may be established by way of the vitreous chamber.

3. A trephined wound in the sclera is closed by newly formed fibrous tissue, in the same manner as a trephined wound at the sclerocorneal margin.

4. A trephined wound of the sclera in glaucoma is not a more dangerous wound than a wound in the sclerocorneal margin.

5. The clouding of the cornea and vitreous, and the arterial glaucomatous pulsations on the disk may be instantly relieved by drainage from the vitreous, with immediate restoration of vision.

6. The "full feeling" and the pain of acute glaucoma are relieved by sclerocorneal trephining, even though the choroid is not disturbed and there is no apparent lowering of the tension.

7. The lens is not affected by the operation.

8. Miotics are of as great value following the operation as before it.

9. A painful glaucomatous eye will become comfortable after postciliary scleral trephining without visible operative defect, and without material lowering of tension. J. J. HOMPES.

Hansell, H. F.: Successful Extraction of an Opaque and Dislocated Crystalline Lens. *N. Y. M. J.*, 1918, cviii, 1120.

The patient, a woman of forty-five, gave no history of injury and examination did not show the iris to be tremulous or disclose other signs of luxation. A minus glass of 10 D was worn. Both lenses were diffusely and uniformly opaque, and on doing a preliminary iridectomy, vitreous presented in the wound, which was the first intimation that the lens was not in its place.

Several weeks later the lens was extracted, a large conjunctival flap being made before making the limbus incision, through which the lens was removed in its capsule by the wire loop.

The author lays stress on the conjunctival flap and states that it must be dissected far back, quite up to the fornix, that the silk sutures must be in place and loosely tied, and unless the flap is brought exactly into position, it may force the lips of the corneal wound apart. S. S. HOWE.

Allport, F.: Operation for Senile Cataract. *N. Y. M. J.*, 1918, cviii, 841.

This article is a collection of personal experiences in cataract operating and is neither dictatorial nor exhaustive.

The author operates upon one eye at a time. Patients are in the hospital twenty-four hours before operation for the purpose of preparing the eye, getting accustomed to the surroundings, and the administering of a laxative and the prescribing of a careful diet. An urinalysis and other examinations are made. The face, lashes, etc., are thoroughly cleaned, the eye irrigated, and bichloride ointment massaged into the eye. Over this a bandage is placed. This is done several times before the operation.

Atropine is used. If possible the operation is performed on the bed or in the patient's bedroom; but if performed in an operating room, the patient should be moved as little as possible after the operation.

Allport wears tight-fitting rough rubber gloves, and illuminates the eye brilliantly with a condensed hand-lamp.

The patient should be quietly informed what is being done from time to time and should not be encouraged to talk. All water used should be warm and should not be dropped from a distance, as it startles the patient and makes him jump.

Allport emphatically believes in a preliminary iridectomy. After the corneal incision is made, a holocaine and cocaine solution is dropped on the incision and a little of it is allowed to get into the anterior chamber; this deadens sensibility and insures ocular quietude during the remainder of the operation.

Allport uses a lid elevator instead of a speculum as there is less likelihood of pressure upon the eyeball during the operation and the consequent liability of escape of vitreous.

After the lens has been delivered, all possible remaining lens substance that can be removed with safety should be milked out. The Allport anterior chamber irrigator should then wash out all possible lens substance remaining. This irrigator consists of a hand-bag, about a foot of rubber tubing, and a gold point shaped somewhat like a large strabismus hook flattened. This point serves both as an irrigator and as a spatula. Atropine and bichloride ointment is now placed in the eye and a triangular adhesive plaster bandage applied over both eyes, over which an aluminum shield is strapped over the eyes by adhesive straps.

Allport administers a chloral and bromide mixture at bed time for a night or two. The hands are gently tied with a bandaged cloth to the bed for a few days and a day nurse and a night nurse are engaged, if possible.

The eye is not disturbed, unless necessary, for about three days.

Thompson, W. R.: The Rational Etiology and Satisfactory Treatment of Dacryocystitis. *J. Am. M. Ass.*, 1918, lxxi, 1727.

The author presents a new operative procedure for the removal of obstruction to the normal drainage of the lachrymal sac and the remedy for the consequent symptoms and pathology of such obstruction. The operation is based on his theory of the etiology of lachrymal duct obstruction, namely, that it is due to a retained foreign body in the nasal duct. He gives the following reasons for such retention:

1. The duct must carry solid material as well as fluids.

2. It has no ciliated epithelium to assist in the passage of solids.

3. The mucous membrane lining is thrown into folds resembling valves which would tend to hold solid material.

On this anatomical basis he believes it reasonable to suppose that the retention of foreign matter is likely, which in time is increased in size by the deposition of salts from tears and serum.

He points out that the sequence of symptoms and

pathology following stricture of the nasal duct, beginning with epiphora and going on to pus formation or mucocele is what would be expected as the result of the presence of a foreign body in the duct, with its irresistible tendencies to inflammation, ulceration, and accretion.

After experiencing the usual failures in treatment of obstruction by probes, he came to the conclusion that it would be better to remove the stricture, which he does by the use of Burk's flexible wire ear curette of different sizes. These are passed to the sac and nasal duct after slitting the canaliculus in the usual way, care being taken to make the opening into the sac large enough to admit easily the longest sized curette.

Four case reports are given which substantiate the author's contention of the efficacy of his procedure. J. J. HOMPES.

EAR

Graham, H. B.: Osteosclerosis of the Temporal Bone in Chronic Suppuration. *Laryngoscope*, 1918, xxviii, 872.

Graham believes, contrary to the view held by Cheatle of London, that osteosclerosis of the mastoid can be a result of chronic suppuration, rather than a cause.

Anteroposterior stereoscopic plates can demonstrate the condition. OTTO M. ROTT.

Kyle, J. J.: The Modern Mastoid Operation. *Laryngoscope*, 1918, xxviii, 805.

The author condemns the packing of the mastoid wound with gauze, and instead advocates simple drainage and irrigation by means of rubber tubing. With this method he claims:

1. The middle ear becomes dry, as a rule in twenty-four hours after the simple operation.
2. The posterior bone cavity is sterile in a few days after operation, at which time the tube may be withdrawn.
3. Healing is more rapid than by any other form of dressing.
4. In exposure of the lateral sinus and dura, this method is the most logical and satisfactory way of draining.
5. An abscess in a mastoid process, ethmoid sinuses or antrum of Highmore, should as far as possible be drained, constantly aerated and flushed with warm salt solution, preferably twice a day. The result of long suppuration and slow healing is usually due to packing with gauze and lack of aeration. OTTO M. ROTT.

Bowers, W. C.: Answer to Opponents of the Radical Mastoid Operation. *Laryngoscope*, 1918, xxviii, 790.

After answering in great detail the various objections against the radical mastoid operation, and citing his technique, the author tabulates his results in 112 cases and offers the following conclusions:

1. Many men are performing radical mastoid operations without reasonable proficiency.
2. Many radical mastoid operations are performed when not indicated.
3. Too little consideration is often given to preservation of hearing.
4. Many cavities are not properly cared for either by the surgeon or by the patient.
5. It is possible to get dry cavities and improved hearing, and these results are attainable in most cases.
6. The operation is not dangerous and complications are usually avoidable.
7. The condition calling for operation is usually a very dangerous one and is too frequently dealt with lightly. OTTO M. ROTT.

Yorke, C.: Ablation of the Labyrinth in a Case with Ménière's Disease. *Brit. M. J.*, 1918, ii, 420.

It has been customary to designate under the name "Ménière's disease" a sudden hæmorrhage into the labyrinth causing a violent onset of deafness, tinnitis, vertigo, nausea, and vomiting. It is known, however, that a similar combination of symptoms may result from conditions other than hæmorrhage, i.e., infective processes, vascular disturbances, etc.

In a case described by the author, the patient, a man aged fifty-one years, showed advanced bilateral labyrinth disease with Ménière's paroxysms. The symptoms were more pronounced on the left side. There was no infective disease. Operation consisted of ablation of the left labyrinth. It was followed by the typical clinical picture of traumatic destruction of the labyrinth.

A year and a half has since passed and during that time the patient has not vomited nor experienced dizziness. The author considers that the patient is entirely cured of the Ménière attacks, and that the operation has been entirely successful.

W. A. BRENNAN.

SURGERY OF THE NOSE, THROAT, AND MOUTH

NOSE

Moore, T. W.: The Present Status of the Operative Treatment of Chronic Frontal Sinusitis. *J. Am. M. Ass.*, 1918, lxxi, 1811.

The author states that most cases can be cured be establishing ventilation and drainage, preferably by the Lothrop technique. Obliteration of the sinus is only indicated where there has been extensive necrosis of the bony wall.

A short historical sketch precedes the discussion.

OTTO M. ROTT.

THROAT

Pearson, W. W.: Fracture of the Hyoid Bone. *J. Iowa St. M. Soc.*, 1918, viii, 395.

A man sixty-four years of age, while eating meat, was seized with a fit of coughing; immediately he had difficulty in swallowing and supposed that a piece of bone from the meat had lodged in the throat.

During the next five days he took practically no food or drink. He was then taken to the author's office where an examination with the broncoscope and the œsophagoscope revealed nothing abnormal; while in the position for the latter examination, a glance at the neck revealed a lack of symmetry which suggested an X-ray picture. The latter revealed a fracture of the greater wing of the hyoid.

The patient's neck was strapped, he returned home, was able to eat, and made an uneventful recovery.

The author refers to the literature of the subject and mentions possible complications and different types of treatment that have been employed.

MOUTH

Black, A. D.: Roentgenographic Studies of Tissues Involved in Chronic Mouth Infections. *J. Am. M. Ass.*, 1918, lxxi, 1279.

Black reports a total of 6,000 films, divided into two types: (1) those that begin with inflammation of the gingiva and progress along the side of the root toward the apex, known as chronic suppurative pericementitis; (2) those which, subsequent to the death of the pulp of the tooth, cause a destruction of the bone at about the apex of the root, known as chronic alveolar abscess. He found chronic infection about the teeth in the following proportions: 57 per cent between the ages of twenty and twenty-four; 64 per cent between the ages of twenty-five and twenty-nine; 88 per cent between the ages of thirty and thirty-nine; 90 per cent between the ages of forty and forty-nine; and 98 per cent past the age of fifty.

The purpose of tabulating infection about the teeth was to obtain the best possible information as to the physical condition of persons manifesting infection involving the teeth. Inquiry was made as to enlarged finger-joints, muscles or joints which were occasionally painful, the condition of the nose and throat, inflammation of the eyes, etc. Of the 501 who were questioned, 363 reported being entirely negative as to secondary systemic disorders, 72 complained of occasional muscular or joint symptoms, and 66 reported well defined cases of arthritis, nephritis, appendicitis, etc.

The effect of the study of these cases is to bring dentists to the realization that it is their positive duty to free the mouths of patients from infection, even though this requires the extraction of a number of teeth.

M. N. FEDERSPIEL.

Bulkley, L. D.: Cancer of the Oral Cavity. *Dental Cosmos*, 1918, lx, 774.

Bulkley calls attention to the great responsibility of the dentist concerning cancer of the oral cavity. For it is he, of all others, who is likely to see the beginning of the disease.

Bulkley reports that in the United States registration, deaths from cancer of the oral cavity have increased more than those in any other locality. The importance of early and accurate differential diagnosis in the oral cavity should be given due consideration, i.e.; syphilis, aphthous stomatitis, leucoplacia, tubercular lesions, etc. The exciting causes of cancer of the oral cavity are irritating, rough, broken or decayed teeth, ill-fitting bridges, plates, tobacco, syphilis, and alcohol.

M. N. FEDERSPIEL.

Federspiel, M. N.: Some Observations on the Treatment of Cleft Palate. *Wisconsin M. J.*, 1918, xvii, 258.

Federspiel classifies the degrees of cleft palate as follows:

1. The cleft involves the hard and soft palate, the alveolar process, and the lip.
2. The cleft involves the hard and soft palate only, having the anterior alveolar process and the lip normal.
3. The cleft involves only a portion of the hard palate and all of the soft palate.
4. The cleft involves all of the soft palate only.
5. The cleft is a mere bifurcation of the uvula.

There have been theories as to the etiology of cleft palate. The author believes that heredity is an important factor, calling attention to the frequency of the condition in certain families.

The treatment of cleft palate is surgical, but it

may be surgical and mechanical, or mechanical only. Some cases do well with only mechanical treatment. The surgical repair of congenital clefts of the palate and alveolar process depends largely upon the degree of deformity, the age of the patient, and whether the patient has sufficient vitality and resistance to withstand the shock of the operation or the complications which may arise.

In cases which have a double alveolar cleft with the central portion of the os incisivum displaced forward and attached to the tip of the nose, the author usually performs a submucous resection of the vomer by removing a V-shaped section. In other cases, it is only necessary to split the vomer to allow the septum to overlap when the protruding os incisivum is forced backward. If, however, the os incisivum is undeveloped or at an age when tooth eruption has taken place, it is impossible to follow the above method. In the latter case he removes the protruding mass and prepares this area to act as a good stump for artificial restoration.

In order to relieve the lateral tension in cleft palate operations, the author does a combined uranoplasty and staphylorrhaphy after the method of Langenbeck. The technique consists of four steps: (1) freeing of mucoperiosteal flaps; (2) freshening the edges of the cleft; (3) placing and tying of sutures; (4) relief of lateral tension.

This procedure is accomplished by first cutting the mucous membrane along the entire borders of the cleft and separating the soft tissue by periosteal elevators and cutting the tissue loose from the distal surface of the horizontal plates of the palate bone. The hæmorrhage thus produced may be stopped by pressing a gauze sponge against the bleeding surface. The edges of the cleft are freshened by grasping the uvula on one side with a catch forcep and putting tension on the soft tissues, then with a very sharp thin-bladed knife cutting a thin marginal strip along the entire flap from the uvula to the apex of the cleft. This same procedure is carried out on the opposite side. The freshened surface should be cut square with the flap tissue. Various kinds of suture material are used for holding the pared edges together, such as silk, horse-hair, linen, catgut, wire, etc.

In order to prevent the suture material from cutting out and at the same time to relieve the tension as well as to render the palatal tissues inflexible, the author has devised a tension plate made from non-corrosive metal B.I.B. American gauge 22. In order to fit these plates it is necessary to make a small incision near the gingival border of the last molar. The incision should be sufficiently long to permit the flange of the plate to enter and lie between the palatal bone and soft tissue. Previous to fitting the plates it is necessary to pass silver wire (American gauge 24) through the mucoperiosteal flaps and then through the holes in the plates. The ends of the wire are then passed through perforated lead shot and made tense by pulling the wire and crushing the shot after the borders of the flaps can be approximated without tension. When this is done he denudes the border of the cleft and then places and ties the coaptating sutures after the McCurdy method.

He reports three cases operated upon according to his method, with illustrations showing the various steps of the operation and the results.

G. W. Hochrein.

BIBLIOGRAPHY *of* CURRENT LITERATURE

GENERAL SURGERY — SURGICAL TECHNIQUE

NOTE.—The bold face figures in brackets at the right of a reference indicate the page of this issue on which an abstract of the article referred to may be found.

Operative Surgery and Technique

Free aponeurotic strips in the mobilization of tissues and in the surgery of peripheral nerve injuries. I. SCALONE. Chir. d. organ. di mov., Bologna, 1918, ii, 497.

The postoperative treatment of abdominal cases. J. P. WARBASSE. Am. J. Surg., 1918, xxxii, 289. [295]

Aseptic and Antiseptic Surgery

Disinfection of wounds by antiseptic gas currents. LAVENANT. Presse méd., Par., 1918, xxvi, 651.

Ethero-gomenol dressings for war wounds. L. BAILLEUL and G. WORMS. Progrès méd., Par., 1918, p. 428.

Treatment of 420 infected wounds under battle conditions arriving on the average of fifty-eight and one-third hours after injury, without previous surgical treatment. G. W. CRILE. Canad. M. Ass. J., 1918, viii, 961. [295]

Value of sodium hypochlorites in surgery. I. E. DALE. Rev. de med. y cirug. práct., Madrid, 1918, cxxi, 232.

The value of the dichloramine-T solution (Dakin-Dunham) in the treatment of infections of the upper air passages. D. B. DELAVAN. Am. J. Surg., 1918, xxxii, 306.

The Carrel-Dakin treatment at Oxford; an observation of the Carrel-Dakin method of treating chronic wounds in an orthopedic center in England. J. DUNLOP. Am. J. Orthop. Surg., 1918, xvi, 495. [295]

The value of the Carrel method applied to suppurating wounds at a base hospital. A. RENDU. Lyon chirurg., 1918, xv, 426. [296]

The clinical aspect of streptococcal wounds. J. FIEVEZ. Progrès méd., Par., 1918, p. 418.

Notes on the treatment of sepsis by zinc ionization. A. R. FRIEL. Practitioner, Lond., 1918, ci, 315.

The closure of wounds. B. E. KINNE. J. Am. Inst. Homœop., 1918, xi, 631.

Primary or very early closure of gunshot diaphyseal fractures. G. PICOT. J. de chir., Par., 1918, xv, 15.

The application of a concentrated solution of magnesium sulphate to scalds and burns. S. J. MELTZER. J. Pharmacol. & Exp. Therap., 1918, xii, 211. [296]

The progress of cicatrization of war wounds and the agents capable of influencing it. T. TUFFIER and R. DESMARRES. J. de chir., Par., 1918, xv, 1. [296]

Minor injuries; physical conditions which influence healing. E. O. WITHERSPOON. Am. J. Surg., 1918, xxxii, 299.

Anæsthetics

Deep anæsthesia and its dangers. J. D. MORTIMER. Med. Press, 1918, cvi, 440.

Heart lesions in anæsthesia. F. L. RICHARDSON. Med. Press, 1918, cvi, 442. [297]

The circulation in general anæsthesia. L. BINET. Presse méd., Par., 1918, xxvi, 661.

Nitrous oxide and oxygen in combination with ether or C. E. mixture for nose and throat operations. H. E. G. BOYLE. Brit. M. J., 1918, ii, 684.

Liver damage and death from chloroform. T. FAHR. Deutsche med. Wchnschr., 1918, xliv, 1218.

Technique and indications of anæsthesia by intrarectal etherization. R. MONOD. Presse méd., Par., 1918, xxvi, 630.

Light chloroform narcosis for transport. H. M. STEPHENSON. Brit. M. J., 1918, ii, 629.

Spinal anæsthesia. F. R. WRIGHT. J.-Lancet, 1918, xxxviii, 714.

Surgical Instruments and Apparatus

A new apparatus for puncture of the superior longitudinal sinus. A. GOLDBLOOM. Am. J. Dis. Child., 1918, xvi, 388. [298]

Dilator for nasal fossæ. HALPHEN. Bull. et mem. Soc. de chir. de Par., 1918, xliv, 1690.

A new counting chamber for cells, etc., in fluids. K. S. BHAT. Proc. Roy. Soc. Med., 1918, xii, Sect. Dis. Child., 4.

Paraffin drains; a new principle for surgical drainage. A. L. SORESI. Policlin., Roma, 1918, xxv, sez. chir., 353.

A new tendon-tucker. W. BISHOP. J.-Lancet, 1918, xxxviii, 680.

Automatic crural muscle distendor. DARTIQUES. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1778.

The Balkan frame. A. A. SMITH. Trained Nurse & Hosp. Rev., 1918, lxi, 351.

The triangle splint in the treatment of compound fractures of the humerus. P. TURNER. Brit. M. J., 1918, ii, 711. [298]

Ulnar humeral suspension for loose elbow-joint. PATEL. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1838.

Treatment of humerus fractures by a new apparatus. PECHARMANT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1753.

Apparatus for forearm fracture. P. DELBET. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1731.

Apparatus for upper limb fractures. ROOD. Paris chirurg., 1918, vol. x.

Metallic splint for femur fractures. J. GUYOT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1843.

A plaster traction apparatus for femur fractures. L. CERCIONE. Policlin., Roma, 1918, xxv, sez. prat., 1254.

Immediate apparatus for lower limb amputations. ROEDERER. Progrès méd., Par., 1918, p. 409.

Temporary peg legs. G. D. FREER. Brit. M. J., 1918, ii, 669.

SURGERY OF THE HEAD AND NECK

Head

Treatment of facial cicatrices. A. POULARD. Survey Head Surg., 1918, i, 231.

Plastic on face. A. J. OCHSNER. Surg. Clin. Chicago, 1918, ii, 1176.

Retention cysts of the mucous membrane of the lip. R. L. SUTTON. J. Cutan. Dis., 1918, xxxvi, 579.

Radium treatment for epithelioma of the lower lip. G. ELLIOTT. Internat. J. Surg., 1918, xxxi, 394.

Nasal and paranasal plastics for war injuries. GUISEZ. Paris méd., 1918, viii, 198. [298]

Orbital plastic operations. F. LAGRANGE. Bull. Acad. de méd., Par., 1918, lxxx, 641.

Reconstruction of ears and nose. C. BECK. Surg. Clin. Chicago, 1918, ii, 1217.

The diagnosis of sinus thrombosis. A. BRAUN. N. Y. M. J., 1918, cviii, 1069.

Parotitis as a complication of influenza. D. I. MACHT. Med. Rec., 1918, xciv, 1117.

A short review of another year's work at a jaw injuries center. G. NORTHCROFT. Proc. Roy. Soc. Med., 1918, xii, Sect. Odontol., 7.

Fractures of the lower jaw. L. IMBERT and P. RÉAL. Lyon chirurg., 1918, xv, 385. [299]

Bone grafting in gunshot fractures of the jaw. W. BILLINGTON, A. H. PARROTT and H. ROUND. Brit. M. J., 1918, ii, 679.

Extraction of a projectile situated in the maxillary sinus. A. M. SURREL. J. de radiol., Par., 1918, iii, 113.

Hemiplegia due to truama in the opposite parieto-temporal region. A. ROCCAVILLA. Gaz. d. osp. e d. clin., Milano, 1918, xxxix, 593.

Magnetic extraction of intracranial projectiles. DARBOIS. J. de radiol., Par., 1918, iii, 119.

Cranial wounds. A. DE CASTRO. Gaz. d. osp. e d. clin., Milano, 1918, xxxix, 624.

Intracranial complications of diseases of the ear, nose, and throat. H. HASTINGS. Calif. St. J. Med., 1918, xvi, 520.

The piston action of the vertebral column developed in certain types of cranial fractures. N. W. SHARPE. Bull. Johns Hopkins Hosp., 1918, xxix, 281.

A case of turret skull. E. MEIRELLES. Brazil-med., 1918, xxxii, 356.

Denker's operation as an approach to base of the skull. BRUENINGS. Deutsche med. Wchnschr., 1918, xliv, 1231.

Treatment of neuralgia of the fifth nerve by injection of the gasserian ganglion. H. H. MARTIN. J. Am. M. Ass., 1918, lxxi, 1970. [299]

Four cases of cranial wall restoration. P. SEBILEAU. Bull. et. mém. Soc. de chir. de Par., 1918, xliv, 1843.

Radiosurgical collaboration in cranial surgery. C. VILLANDRE. J. de radiol., Par., 1918, iii, 116.

Extirpation of the choroid plexus of the lateral ventricles in communicating hydrocephalus. W. E. DANDY. Ann. Surg., Phila., 1918, lxviii, 569. [299]

A case of meningocele. A. F. DE MAGALHAES. Brazil-med., 1918, xxxii, 379.

Clinical study of osteitis of the apex of the petrous bone; treatment of meningitis by lavage of the meningeal cavities. BELLIN, ALOIN, and VERNET. Lyon chirurg., 1918, xv, 455.

Brain abscess with autopsy findings. G. B. WOOD. Survey Head Surg., 1918, i, 193.

Extraction of an intracerebral projectile by means of an electromagnet under control of a fluoroscopic screen. LAPEYRE. Survey Head Surg., 1918, i, 234.

Neck

Treatment of acute threatening symptoms in surgical diseases of the neck region. F. COLMERS. Deutsche med. Wchnschr., 1918, xliv, 1289.

Arteriovenous aneurisms of the cervical region. M. MEYER. Deutsche med. Wchnschr., 1918, xliv, 826.

Hæmorrhage from an aneurism of the internal carotid artery, following septic sore throat. J. RANSOHOFF. Survey Head Surg., 1918, i, 222.

The sign of hyperesthesia of the thyroid region and early Basedow disease. C. LIAN. Presse méd., Par., 1918, xxvi, 665.

Some unsettled points in the surgery of the thyroid gland. M. BALLIN. J. Mich. St. M. Soc., 1918, xvii, 463.

Acute necrosis of the thyroid gland. A. D. BEVAN. Surg. Clin. Chicago, 1918, ii, 1089. [300]

Thyroid therapy. A. L. BLACKWOOD. Clinique, Chicago, 1918, xxxix, 516.

The electrocardiogram in thyroid disease. P. D. WHITE. J. Exp. Med., 1918, xxii, 766.

Syphilis of the thyroid gland; report of a case. E. H. SCHNEIDER. Calif. St. J. Med., 1918, xvi, 484. [301]

Metastatic goiter. G. LECLERC and P. MASSON. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1815.

Exophthalmic goiter (Graves' disease); 2,000 cases. H. V. HALBERT. Clinique, Chicago, 1918, xxxix, 501.

SURGERY OF THE CHEST

Chest Wall and Breast

A study of 450 cases of wounds of the chest, with special reference to a new method of treatment for infected hæmothorax. W. HUTCHINSON. Canad. M. Ass. J., 1918, viii, 972. [301]

Regional anæsthesia in breast amputations for cancer. G. LABAT. Presse méd., Par., 1919, xxvii, 16.

Notes on the diagnosis of acute infections in the thorax. L. LITCHFIELD. Med. Clin. N. Am., 1918, ii, 517.

Induced pneumothorax; its use in treatment of pulmonary tuberculosis; with report of 202 cases. E. MORRIS. Illinois M. J., 1918, xxxiv, 306.

Artificial pneumothorax by manual loosening of the flat, adherent lung. H. ULRICI. Deutsche med. Wchnschr., 1918, xliv, 1221.

Discussion of an undescribed complication of pneumothorax treatment. KACH. Deutsche med. Wchnschr., 1918, xliv, 1206.

The radiologic diagnosis of hæmothorax. DARBOIS. J. de radiol., Par., 1918, iii, 115.

A note on pleurisy. O. S. HAINES. Hahneman. Month., 1918, liii, 739.

Aseptic hæmorrhagic pleural effusions in the course of grippal pulmonary affections. C. RICHET and A. BARBIER. Bull. et mém. Soc. méd. d. hôp. de Par., 1918, xlii, 1016.

Treatment of purulent postgrippal pleurisies; anterior axillary drainage and intermittent irrigation. L. BÉRARD and C. DUNET. Bull. Acad. de méd., Par., 1918, lxxx, 622. [302]

Treatment of primary serofibrinous pleuritis. V. PANTO. Gaz. d. osp. e d. clin., Milano, 1918, xxxix, 604.

The Capparoni method in the treatment of pleuritis and tubercular peritonitis. M. MAURIZI. Gazz. d. osp. e d. clin., Milano, 1918, xxxix, 507.

A study of pleural drainage; treatment of choice of purulent pleurisies. L. CHEVRIER. Presse méd., Par., 1918, xxvii, 9. [302]

Modern treatment of purulent pleuropneumonia. A. MARIEN. Union méd. du Canada, 1919, xlviii, 57.

Transformation of a hæmorrhagic pleurisy subsequent to a pulmonary infarct into a putrid effusion. A. LEMIERRE. Bull. et mém. Soc. méd. d. hôp., Par., 1918, xlii, 1001.

Siphonage of the pleura for a chest bullet wound. P. DELBET. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1777.

Clinical manifestations of empyema. W. T. VAUGHAN. J. Lab. & Clin. Med., 1918, iv, 123.

Postpneumonic empyema. T. G. MOORHEAD. Med. Press, 1918, cvi, 476. [303]

Pneumonia and empyema at Camp Upton, N. Y. R. L. CECIL. Med. Clin. N. Am., 1918, ii, 567.

Streptococcus pneumonia and empyema; an infection affecting eight members of one family, with seven deaths. W. L. BIERRING, C. B. LUGINBUHL, and C. W. BURT. J. Am. M. Ass., 1918, lxxi, 1475. [303]

Empyema; some observations made in the fluoroscopic study of a series of 64 cases. C. H. NIMS. Mil. Surgeon, 1918, xliii, 538. [303]

The surgical treatment of empyema by a closed method. A. E. MOZINGO. J. Am. M. Ass., 1918, lxxi, 2062.

Experimental study of mediastinal emphysema. C. ACHARD. Bull. Acad. de méd., Par., 1918, lxxx, 609. [303]

Mobile mediastinal projectile. A. M. CHEVALIER. J. de radiol., Par., 1918, iii, 114.

Trachea and Lungs

A rare case of intrapulmonary projectile. E. SALSAC. Arch. d'électric. méd., Par., 1918, xxvi, 412.

Screen control removal of projectiles from the superficial and middle zones of the lung after thoracotomy. MAUCLAIRE. Bull. Acad. de méd., Par., 1918, lxxx, 488.

Thoracoplastics for pulmonary tuberculosis. L. S. HANNEMA. Nederl. Tijdschr. v. Geneesk., 1918, ii, 1661.

Dermoid cyst of lung. A. N. CAMARGO. Ann. Paulist de med. e cirurgia, 1918, ix, 205.

Pneumonia and its complications at Camp Dodge. J. L. MILLER. J. Iowa St. M.Soc., 1918, viii, 419.

Primary malignant neoplasms of the lung and pleura. M. PACKARD. N. Y. St. J. Med., 1918, xviii, 472.

Pulmonary spirochætosis; a preliminary note on spirochætes in the sputum of soldiers admitted to special malaria wards. J. A. THOMSON. Brit: M. J., 1918, ii, 709.

Progress in lung surgery. SAUERBRUCH. Deutsche med. Wchnschr., 1918, xliv, 1320. [304]

Foreign body in the right bronchus; illustrating the value of thorough radiography. S. N. KEY. Texas St. J. Med., 1918, xiv, 278.

Some bronchoscopic and œsophagoscopic foreign bodies I have known. R. C. LYNCH. Texas St. J. Med., 1918, xiv, 275.

Heart and Vascular System

Measurement of the blood velocity by radioscopy of the heart. C. TALENTONI. Gazz. d. osp. e d. clin., Milano, 1918, xxxix, 643.

Meningococcic pericarditis, with report of 12 cases. W. W. HERRICK. Med. Clin. N. Am., 1918, ii, 411.

A case of removal of a rifle bullet from the right ventricle of the heart. M. WHITE and C. BALLANCE. J. Roy. Army M. Corps, 1918, xxxi, 484.

Projectile free in the right ventricle of heart travelling by the venous route. M. PONZIO. Riforma med., Napoli, 1918, xxxiv, 834.

Anomalies of the pulmonary veins. P. B. MAC CREADY. Bull. Johns Hopkins Hosp., 1918, xxix, 271.

Pharynx and Œsophagus

Foreign body of œsophagus. E. DURESNE. Union méd. du Canada, 1919, xlviii, 85.

The treatment of lye strictures of the œsophagus. T. HUBBARD. J. Am. M. Ass., 1918, lxxi, 1706. [304]

Œsophageal imperforation. A. KOTZAROFF. Ann. de gynéc. et d'obst., Par., 1918, lxxii, 203. [305]

SURGERY OF THE ABDOMEN

Abdominal Wall and Peritoneum

Abdominal or bilocular hydrocele. R. B. COLEMAN. Brit. M. J., 1918, ii, 629.

A case of retroperitoneal lipoma. U. G. RAO. Madras M. J., 1918, i, 342.

Varices of the abdominal subcutaneous veins. E. GREGGIO. Gazz. d. osp. e d. clin., Milano, 1918, xxxix, 636.

The question of sterilizing women when operating for tubercular peritonitis. J. H. CARSTENS. Am. J. Obst., N. Y., 1918, lxxviii, 849.

Rupture of recurring hernia. J. DUBS. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 1579.

Diagnosis and operation of chronic diaphragmatic hernia after gunshot wound. ELS. Deutsche med. Wchnschr., 1918, xliv, 1205.

Hernia of the urinary bladder. S. A. GAY. Am. J. Surg., 1918, xxxii, 301.

Operation for inguinal hernia. A. VON MUTACH. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 1573.

A case of strangulated hernia. F. NOGUEIRA. Brazil-med., 1918, xxxii, 391.

A case of umbilical hernia. A. A. REGO and L. R. FILHO. Arch. brasil de med., 1918, viii, 619.

Perforation of tuberculous mesenteric glands. H. ISELIN. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 1569.

The benefits of stab-wound drainage in pelvic infections. H. W. YATES. Am. J. Obst., N. Y., 1918, lxxviii, 745.

Gastro-Intestinal Tract

Contributions to the physiology of the stomach. J. MEYER. J. Exp. Med., 1918, xxii, 759.

Studies in fractional estimation of stomach contents. B. B. CROHN. Am. J. M. Sc., 1918, clvi, 656. [305]

The opaque meal versus the stomach tube in the diagnosis of gastric hypomotility. I. H. LEVY. Am. J. M. Sc., 1918, clvi, 795.

The early diagnosis of lead poisoning. G. L. APPELBACH. Am. J. M. Sc., 1918, clvi, 781.

The time food remains in the stomach. L. DE ZILWA. Indian M. Gaz., 1918, liii, 463.

Acute perforations in the abdomen. A. E. BARKER. J. So. Car. M. Ass., 1918, xiv, 307.

Perforated gastric and duodenal ulcers. H. HERTZ. Ugesk. f. Læger, Copenhagen, 1918, lxxx, 1801.

Fibromyoma of stomach simulating stomach ulcer. L. L. MCARTHUR. Surg. Clin. Chicago, 1918, ii, 1233.

Pain and ulcer in stomach secondary to appendicitis. J. C. ROUX. Paris méd., 1918, viii, 446.

Resection of gastric ulcer. P. CARNOT. Paris méd., 1918, viii, 451.

Surgical treatment of gastric ulcer. V. PAUCHET. Paris méd., 1918, viii, 456.

Acute gastric dilatation. W. J. GILLETTE. Am. J. Obst., N. Y., 1918, lxxviii, 758.

Some phases of the surgery of the stomach and duodenum. J. T. BOTTOMLEY. Boston M. & S. J., 1918, clxxix, 719.

Chronic vicious cycle following gastro-enterostomy. A. D. BEVAN. Surg. Clin. Chicago, 1918, ii, 1119.

Vicious circle after gastro-enterostomy and the means of remedying it. VULLIET. Rev. méd. de la Suisse Rom., 1918, xxxviii, 673. **[306]**

Polya's method of anastomosing the proximal gastric stump with the jejunum. E. M. VON EBERTS. Canad. M. Ass. J., 1918, viii, 1093.

Ventral hernia following laparotomy. B. E. DAWSON. Natl. Eclect. M. Ass. Quart., 1918, x, 122.

A case of pyloric stenosis. F. LUZ. Brazil-med., 1918, xxxii, 366.

Pyloric strictures. P. DELBET. Rev. gén. de clin. et de thérap., 1918, xxxii, 785.

The fractional examination of the duodenal contents. M. EINHORN. Am. J. M. Sc., 1918, c vi, 817.

Radiologic symptoms of duodenal ulcer. S. CARRO. Med. Ibera, Madrid, 1918, v, 263.

Arteriomesenteric ileus of duodenojejunal flexure. W. H. FISHER. Ann. Surg., Phila., 1918, lxviii, 582. **[306]**

Intestinal obstruction; continued studies. H. B. EISBERG and J. W. DRAPER. J. Am. M. Ass., 1918, lxxi, 1634. **[307]**

Intestinal occlusion by volvulus of iliac sigmoid. I. BLANC Y FORTACIN. Rev. de med. y cirug. práct., Madrid, 1918, cxxl, 289.

Studies on the aseptic end-to-end anastomosis of the intestine. E. G. GREY. Bull. Johns Hopkins Hosp., 1918, xxix, 267. **[307]**

Intestinal intoxication. A. VASUDEVAN. Madras M. J., 1918, i, 332.

The function of the human appendix. PETER. Deutsche med. Wchnschr., 1918, xliv, 1231.

The examination of vermiform appendix by X-rays. E. I. SPRIGGS. Med. Press, 1918, cvi, 445.

Differential diagnosis of appendicitis. D. T. HERNANDO Y ORTEGA. Siglo méd., Madrid, 1918, lxv, 979, 1036.

False grippal appendicitis. E. VILLARD. Lyon méd., 1918, cxxvii, 534.

Appendicitis and ectopic testicle. HARTMANN. Rev. gén. de clin. et de thérap., 1918, xxxii, 808.

A gangrenous appendix attached to a gangrenous Meckel's diverticulum. T. H. HANCOCK. Internat. J. Surg., 1918, xxxi, 408.

Results of treatment in 600 cases of appendicitis. G. P. LA ROQUE. N. Y. M. J., 1918, cviii, 1108.

Tumors of the large intestine. V. PAUCHET. Presse méd., Par., 1918, xxvi, 543. **[308]**

Surgical treatment of chronic constipation. L. C. ROBERTSON. Rev. Asoc. méd. argent., Buenos Aires, 1918, xxix, 384.

Surgical treatment of chronic constipation in pericolitis and ileopelvic megacolon. G. BOSCH ARANA. Rev. Asoc. méd. argent., Buenos Aires, 1918, xxix, 437. **[308]**

The rôle of congenital colonic membranes as a causative factor in disease. J. P. RUNYAN. Am. J. Obst., N. Y., 1918, lxxviii, 770.

Carcinoma at the junction of the descending colon and iliac sigmoid. MAUCLAIRE. Rev. méd. de la Suisse Rom., 1918, xxxviii, 651.

Surgical treatment of chronic colonic affections. A. S. LARRAINZAR. Rev. de cienc. méd., Barcelona, 1918, xliv, 401.

Primary retrograde intussusception of the sigmoid associated with tumor. D. C. BALFOUR. Ann. Surg., Phila., 1918, lxviii, 588.

Diagnosis of rectal and terminal colonic cancer. R. BENSAUDE. Paris méd., 1918, viii, 441.

The end-results of operations for cancer of the rectum, with suggestions for improving them. J. R. PENNINGTON. J. Am. M. Ass., 1918, lxxi, 1892.

Rectal prolapse in children. A. SIERRA. Med. bera. Madrid, 1918, vi, 3.

Temporary colostomy in the treatment of gunshot rectal wounds. M. Barbier. Progrès méd., Par., 1918, p. 435.

Fistula of the rectum. C. J. DRUECK. Med. Fortnightly, 1918, l, 255.

Tuberculosis of the anus. C. J. DRUECK. Internat. J. Surg., 1918, xxxi, 399.

A study of the anus, rectum, and sigmoid. H. H. WHEELER. J. Indiana St. M. Ass., 1918, xi, 442.

Anal and rectal surgery. J. R. PENNINGTON. Mississippi Valley M. J., 1918, xxv, 363.

The knifeless treatment of piles. S. L. KATZOFF. N. Y. M. J., 1918, cviii, 1081.

Liver, Pancreas, and Spleen

Embolic anæmic infarcts of the liver. ASKANAZY. Rev. méd. de la Suisse Rom., 1918, xxxviii, 653.

Double shrapnel wound of the liver and pancreas. COMBIER and MURARD. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1700.

Gall-bladder disease and its differential diagnosis. J. F. ERDMANN. Am. J. Obst., N. Y., 1918, lxxviii, 752.

Value of examining the duodenum in diagnosing gall-bladder disease. W. STEPP. Deutsche med. Wchnschr., 1918, lxiv, 1190.

Gall-bladder infection. F. M. ANDRUS. Nat. Eclect. M. Ass. Quart., 1918, x, 107.

Gall-stone disease complicating pregnancy. A. P. HEINECK. Illinois M. J., 1918, xxxiv, 297, 537.

Some observations in gall-bladder surgery. J. W. BOWEN. J.-Lancet, 1918, xxxviii, 504.

Cholecystectomy versus cholecystostomy. L. P. ALLISON. Texas St. J. Med., 1918, xiv, 281.

History analysis applied to surgical diseases of the biliary tract and pancreas. A. O. WHIPPLE. Ann. Surg., Phila., 1918, lxviii, 471. **[309]**

Report of a case of pancreatic cyst in association with tubercular kidney and intestinal complications. J. E. SADLIER. Am. J. Obst., N. Y., 1918, lxxviii, 773. **[310]**

Hæmatic cyst of the spleen. L. TAVERNIER. Lyon méd., 1918, cxxvii, 563.

Splenectomy following radium treatment for myelocytic leukæmia. H. Z. GIFFIN. Med. Rec., 1918, cxiv, 1020.

Miscellaneous

Penetrating gunshot abdominal wounds. V. SAVIOZZI. Clin. chir., Milano, 1918, xxv, 486. **[311]**

Perforating gunshot abdominal wound with perforation of gall-bladder operatively cured. J. S. HUNGRIA. Brazil-med., 1918, xxxii, 372.

The retrococcygeal diverticulum. D. V. JUARISTI. Prog. de los clin., Madrid, 1918, vi, 311.

Splanchnoptosis; its cause, prevention and cure, with special reference to the Duret-Rovsing operation. G. N. KREIDER. J. Am. M. Ass., 1918, lxxi, 2036.

Importance of a complete roentgen study of the gastro-intestinal tract and gall-bladder in all obscure abdominal cases. G. E. PFAHLER. J. Am. M. Ass., 1918, lxxi, 1951. [311]

Transabdominal auscultation. R. ROBINE. Presse méd., Par., 1918, xxvi, 631.

A method of laparotomy. SEMBDNER. Deutsche med. Wchnschr., 1918, xliv, 1220.

Structure of the pelvic cavity in man. M. SEREZ. Prog. de los clin., Madrid, 1918, vi, 265.

SURGERY OF THE EXTREMITIES

Diseases of Bones, Joints, Muscles, Tendons—General Conditions Commonly Found in the Extremities

Fistulous osteitis following war fractures. C. BAMBRIN and MONTAGARD. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1748.

A contribution to the study of pyositis ossificans progressiva. J. ROSENSTIRN. Ann. Surg., Phila., 1918, lxviii, 638.

Light in the treatment of tuberculosis of bones and joints. E. COLLIN. Ugesk. f. Laeger, Copenhagen, 1918, lxxx, 1841.

Bone fistulæ. M. G. BLANCHARD. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1746.

Hæmorrhagic osteomyelitis and sarcoma in bone. G. BARRIE. Am. J. Orthop. Surg., 1918, xvi, 392. [312]

Acuté osteomyelitis in children. A. C. WOOD. Penn. M. J., 1918, xxii, 118.

Pathology and treatment of osteomyelitis. A. R. COLVIN. Minnesota Med., 1918, i, 452.

The etiology and treatment of acute poliomyelitis. E. C. ROSENOW. J.-Lancet, 1918, xxxviii, 624. [312]

Sarcomatous development in the depth of the right thigh in the trajectory of a recent wound. I. VITRAC. Gaz. hebd. d. sc. méd., Bordeaux, 1918, xxxix, 154. [313]

Myeloplax cyst of the femur. A. BROCA. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1775.

Contusion of shoulder; total paralysis of forearm and hand. BARTHELEMY. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1741.

Loose osteocartilaginous bodies in the shoulder-joint. M. S. HENDERSON. Am. J. Orthop. Surg., 1918, xvi, 498. [313]

Abnormal coxalgias. KIRMISSON. Rev. gén. de clin. et de thérap., 1918, xxxii, 784.

Gunshot wounds of the knee-joint with septic arthritis. A. NEVE. Indian M. Gaz., 1918, liii, 459.

Some cases of late arthrotomy of the knee followed by primary suture. P. TRILLAT. Lyon chirurg., 1918, xv, 445.

Two cases of hæmarthrosis of the knee cured without operation. H. CHAPUT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1840.

Diagrams for showing limitation of movements through joints, as used by the Board of Pensions Commissioners of Canada. D. E. H. CLEVELAND. Canad. M. Ass. J., 1918, viii, 1070.

The use of Unna's dressing in the treatment of leg ulcers. H. E. HAPPEL. J. Missouri St. M. Ass., 1918, xv, 360. [314]

Analysis of the method of lengthening the soft parts of a limb by double-fixation traction. V. PUTTI and A. LANDINI. Chir. d. organ. di mov., Bologna, 1918, v, 469.

A case of symmetric lymphangioma of both thighs. H. L. ROCHER. Gaz. hebd. d. sc. méd., Bordeaux, 1918, xxxix, 187.

Injuries to fingers. W. K. HUGHES. Med. J. Australia, 1918, ii, 465.

Acute infection of the fingers. M. A. BERNSTEIN. Surg. Clin. Chicago, 1918, ii, 1255, 1258.

Ankylosis of index-finger. M. A. BERNSTEIN. Surg. Clin. Chicago, 1918, ii, 1267.

Destruction of tendons as a result of an infection of the ring-finger; tendon transplantation. M. A. BERNSTEIN. Surg. Clin. Chicago, 1918, ii, 1261.

The treatment of early and late infections of the hand and fingers, with special reference to tendon transplantations. M. A. BERNSTEIN. Surg. Clin. Chicago, 1918, ii, 1249.

Painful feet. R. McE. SCHAUFFLER. J. Missouri St. M. Ass., 1918, xv, 387. [314]

Treatment of foot-joint suppurations. BECKER. Deutsche med. Wchnschr., 1918, xliv, 1301.

Congenital variations of the big toe sesamoids. S. G. SCOTT. Arch. Radiol. & Electrotherap., 1918, xxiii, 224.

Boot heels as a cause of flat-foot. S. D. FAIRWEATHER. Brit. M. J., 1918, ii, 669.

Fractures and Dislocations

Fractures, especially as related to the general practitioner. J. W. AIRD. Northwest Med., 1918, xvii, 332. [314]

Fractures considered as potential deformities. M. S. HENDERSON. Tr. South. Minnesota M. Ass., Mankato, 1919. [315]

Clavicular fracture. HARTMANN. Rev. gén. de clin. et de thérap., 1918, xxxii, 824.

Suspension and continuous extension in the treatment of thigh fracture. E. ANTOINE and F. MASMONTEIL. J. de chir., Par., 1918, xv, 22.

Vicious consolidation of a femur fracture; amputation, hæmorrhage and ligature of external iliac. J. BOECKEL. Lyon mèd., 1918, cxxvii, 556.

A demonstration of the abduction method of treating fracture of the neck of the femur. R. WHITMAN. Penn. M. J., 1918, xxii, 112.

Treatment of fractures of the neck of the femur by continuous extension in internal rotation. H. CHAPUT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1841.

Early operative treatment of knee-joint gunshot wounds. A. FEDERMANN. Deutsche med. Wchnschr., 1918, xliv, 827.

Luxations and fractures of the elbow. S. G. HURTADO. Rev. Ibero-Am. de cien. méd., Madrid, 1918, xl, 337.

Electric stimulation in war injuries, with special reference to ununited fracture. A. E. BARCLAY. Arch. Radiol. & Electrotherap., 1918, xxiii, 205.

Primary suture of the soft parts in diaphyseal fractures. R. LERICHE. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1486. [315]

Reduction of subtrochanteric fracture. COSTANTINI and VIGOT. Paris méd., 1918, viii, 486.

An analysis of 100 cases of rheumatism. W. H. DEADERICK. South. M. J., 1918, xi, 777.

The "no splint" treatment of fractures about the shoulder, in the humerus, and the elbow. J. W. DOWDEN. Edinb. M. J., 1918, xxi, 328. [315]

Shoulder luxation complicated by fracture of humerus. PECHARMANT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1755.

The Hodgen extension suspension splint. F. G. NIFONG. J. Missouri St. M. Ass., 1918, xv, 432.

Capsulorrhaphy of the shoulder-joint for recurrent luxation. G. RIVEIRE. Lyon chirurg., 1918, xv, 437.

Two cases of metacarpal luxation frontward. A. MOUCHET. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1736.

Compound comminuted fracture of both bones of the leg. A. J. OCHSNER. Surg. Clin. Chicago, 1918, ii, 1173.

The Hodgen splint in the treatment of fractures of the femur. C. F. SHERWIN. J. Missouri St. M. Ass., 1918, xv, 429.

The use of the Thomas splint. E. F. ROOT. Northwest Med., 1918, xvii, 335.

The diagnosis and treatment of injuries to the crucial ligaments. S. A. SMITH. Brit. J. Surg., 1918, vi, 176. [316]

Some remarks on the morbid anatomy and histology of rheumatoid arthritis. T. P. S. STRANGEWAYS. Brit. M. J., 1918, ii, 623.

Demonstrable luxation of sacro-iliac joints. E. T. WENTWORTH. Am. J. Orthop. Surg., 1918, xvi, 443. [317]

Pseudarthroses following war wounds. C. WILLEMS. Arch. de méd. et pharm. mil., Par., 1918, lxx, 350. [317]

Surgery of the Bones, Joints, Etc.

Vanghetti's operation. W. F. BROOK. Brit. M. J., 1918, ii, 626.

Endoprosthetics in rubber in large diaphyseal bone losses. DUCUING. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1798.

A method of overcoming the adherence of tendons after suturing. P. C. C. FENWICK. Brit. M. J., 1918, ii, 542. [317]

The position of the operation for the excision of a cartilage in military surgery. T. E. HAMMOND. Brit. M. J., 1918, ii, 714.

Primary treatment of femur fractures. R. LERICHE. Lyon chirurg., 1918, xv, 489. [317]

Subperiosteal surgery and the mechanism of reparative steogenesis. R. LERICHE and A. POLICARD. Bull. et ém. Soc. de chir. de Par., 1918, xliv, 1693.

Paracervical curvilinear osteotomy of the great trochanter for the treatment of coxa vara. L. LOSIO. Chir. d. organi di mov., Bologna, 1918, v, 635.

A new treatment for compound fracture of the long bones. J. A. MILLER. N. Y. M. J., 1918, cviii, 1028.

The reconstruction of joints. E. PAYR. Deutsche med. Wchnschr., 1918, xliv, 817.

Ligature of the subclavian as a preventive of secondary hæmorrhage after shoulder disarticulation. C. VIANNAY. Lyon chirurg., 1918, xv, 433.

End-results of arthrotomy of the knee for femoral and tibial injuries. R. BADOLLE. Lyon chirurg., 1918, xv, 440.

Senile gangrene; Stephen Smith amputation at the knee. A. D. BEVAN. Surg. Clin. Chicago., 1918, ii, 1095.

Treatment of flail joints following resections. L. TAVERNIER and JALIFER. Lyon chirurg., 1918, xv, 399. [318]

Bone graft after resection of an osteosarcoma of the lower extremity of the radius. P. DELBET. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1775.

Results of hip resections for war wounds. P. CHUTRO. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1732.

Improved technique for leg amputations. PHOCAS. Paris méd., 1918, viii, 435.

General technique for cineplastic amputations. G. BOSCH ARANA. Semana méd., Buenos Aires, 1918, xxv, 201. [318]

Bone graft of the femur. J. BOECKEL. Lyon méd., 1918, cxxvii, 552.

Orthopedic reconstruction work on the hand and forearm. A. STEINDLER. N. Y. M. J., 1918, cviii, 1117.

Plastic motor surgery. H. HOESSLY. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 538.

Cinematic plastics. G. EGIDI. Policlin., Roma, 1918, xxv, sez. prat., 869.

Orthopedics in General

Résumé of five years of the Butterworth Orthopedic Clinic. W. E. BLODGETT. J. Mich. St. M. Soc., 1918, xvii, 461.

Surgical technique in orthopedic surgery. W. G. ELMER. Ann. Surg., Phila., 1918, lxviii, 646. [319]

A new method of finding the articular centers in reference to the construction of orthopedic apparatus. A. LOLLINI. Chir. d. organ. di mov., Bologna, 1918, v, 645.

Faulty postures in children. J. GROSSMAN. Med. Rev. Revs., 1918, xxiv, 708.

Distortion of the pelvis from posture. W. J. MERRILL. Am. J. Orthop. Surg., 1918, xvi, 492. [319]

SURGERY OF THE SPINAL COLUMN AND CORD

Inflammation of the spinal cord. F. H. LUTZE. Hahneman. Month., 1918, liii, 757.

A new method of diagnosing spinal tumors. T. SCHWARTZ. Deutsche med. Wchnschr., 1918, xliv, 1263.

Sciatica of skeletal origin due to vertebral anomalies and the syndrome of Bertolotti. A. ROSSI. Chir. d. organ. di mov., Bologna, 1918, ii, 582. [320]

Treatment of vertebral tuberculosis by fusion operation; report of 210 cases. R. A. HIBBS. J. Am. M. Ass., 1918, lxxi, 1372. [320]

Case of fracture of cervical vertebra; after-treatment by mechanotherapeutics. E. F. CYRIAX. Practitioner, Lond., 1918, ci, 337.

Luxation of the atlas and injury of the odontoid process of axis. T. NAEGELI. Deutsche med. Wchnschr., 1918, xliv, 1206.

Gymnastic exercises in treatment of scoliosis. JOLAND. Paris méd., 1919, ix, 25.

The bent back of soldiers. A. F. HURST. Brit. M. J., 1918, ii, 621.

SURGERY OF THE NERVOUS SYSTEM

Traumatic luxation of the ulnar nerve. J. DUBS. Cor.-Bl. f. schweiz. Aerzte, 1918, lvii, 1711.

The surgical treatment of progressive ulnar paralysis. A. W. ADSON. Minnesota Med., 1918, i, 455.

The successful secondary suture of ulnar nerve; a case of toxic neuritis. W. B. OWEN. Am. J. Surg., 1918, xxxii, 292.

Anterior displacement of the ulnar nerve for suturing it. R. BASTIANELLI. Chir. d. organ. di mov., Bologna, 1918, v, 490.

Lesions of the peripheral nerves. C. G. CUMSTON. N. Y. M. J., 1918, cviii, 1120.

Gunshot wounds of peripheral nerves; in addition, anatomic investigation on the internal structure of large nerve-trunks. O. HEINMANN. Survey Head Surg., 1918, i, 234.

Injuries of the peripheral nerves from the surgical standpoint. H. S. SOUTTAR and E. W. TWINING. Brit. J. Surg., 1918, vi, 279. [321]

Notes on the surgery of the brachial plexus. G. JEAN. Arch. de méd. et pharm. nav., Par., 1918, cvi, 439.

Surgical intervention in gunshot wounds of the nerves. M. FASANO. Policlin., Roma, 1918, xxv, sez. prat., 1049. [322]

MISCELLANEOUS

Clinical Entities—Tumors, Ulcers, Abscesses, Etc.

The complexion in cancer. E. M. PERDUE. Med. Herald, 1918, xxxvii, 314.

Causes of death with cancer. F. MEURSING. Nederl. Tijdschr. v. Geneesk., 1918, xi, 1593.

Does surgery ever cure a case of cancer? M. A. TATE. Am. J. Obst., N. Y., 1918, lxxviii, 749.

Atrophy of tumors by means of blastin-free diet. E. CENTANNI. Riforma med., Napoli, 1918, xxxiv, 626. [322]

Tumors of the coccygeal region. BLEZAIS and PEYRON. Presse méd., Par., 1918, xxvi, 650.

Treatment of torpid ulcers following gunshot wounds. URBAN. Deutsche med. Wchnschr., 1918, xliv, 1207.

Functional methods for studying diseased conditions of certain internal secretory organs. J. ROSENBLOOM. Interst. M. J., 1918, xxv, 869.

Insanity and surgery. T. D. ADLERMAN. Natl. Eclect. M. Ass. Quart., 1918, x, 113.

The duration of the biologic phenomena following the introduction of foreign substances into the organism. L. AMBARD. Presse méd., Par., 1919, xxvii, 11.

Regeneration of fascia and connective tissue. A. BIER. Deutsche med. Wchnschr., 1918, xliv, 1321.

Regeneration of the skin. A. BIER. Deutsche med. Wchnschr., 1918, xliv, 1209.

The physiological action of radiation. W. T. BOVIE. J. Med. Research, 1918, xxxix, 271.

The localization of the physiological effects of radiation within the cell. W. T. BOVIE. J. Med. Research, 1918, xxxix, 251. [322]

A single observation of radium therapy. J. P. RAND. N. Eng. M. Gaz., 1918, lIII, 560.

Some contra-indications of heliotherapy. A. SIERRA. Med. Ibera, Madrid, 1918, v, 183.

Acute adrenal insufficiency. W. BOYD. J. Lab. & Clin. Med., 1918, iv, 133.

The value and limitations of laboratory studies of acidosis in surgery. G. W. CRILE. Ann. Surg., Phila., 1918, lxviii, 457. [323]

War wound intoxication; nitrogenous disintegration of traumatized tissues. P. DUVAL and A. GRIGAUT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1506. [324]

Treatment of Baghdad boils by ionization. T. G. EVANS. Indian M. Gaz., 1918, liii, 448.

Mustard burns. L. D. FRESCOLN. J. Am. M. Ass., 1918, lxxi, 1911.

Some theories of shock. S. J. MELTZER. Penn. M. J., 1918, xxii, 129.

The nature of surgical shock and Henderson's theory of acapnia. A. O. DE ALMEIDA and M. O. DE ALMEIDA. J. Am. M. Ass., 1918, lxxi, 1710. [324]

Treatment of surgical shock in war injuries. J. B. ROBERTS. Penn. M. J., 1918, xxii, 126.

The factors of traumatic shock; its prophylaxis at the advanced surgical post. BERTEIN and NIMIER. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1730.

Traumatic shock and collapse. A. LAPOINTE. Paris méd., 1918, viii, 480.

Discussion of traumatic shock. KIRMISSON and others. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1809.

The interpretation of the manifestations of shock. C. C. GUTHRIE. Penn. M. J., 1918, xxii, 123.

Surgical projector. H. HARTMANN. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1846.

Surgery of diabetic patients. M. LABBÉ. Ann. de méd., Par., 1918, v, 428.

Some unusual surgical cases. R. MAGAREY. Med. J. Australia, 1918, ii, 511.

Emergency surgery. A. S. M. TYMMS. Med. J. Australia, 1918, ii, 449, 466. [325]

Sera, Vaccines, and Ferments

Remarks on Moro's percutaneous inunction test, and Von Pirquet's cuti-reaction test; with report of cases in which they were applied. J. W. ALLAN. Glasgow M. J., 1918, viii, 321.

First results of systematic trials of antigangrenous preventive serotherapy. P. DUVAL and E. VAUCHER. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1535. [325]

Antigangrenous serotherapy by the injection of antibellonensis and antivibrion-septic sera. E. MARQUIS and others. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1522. [326]

The intensive vaccine treatment of lung complications in the present epidemic of influenza. E. O. HOUDA. Northwest Med., 1918, xvii, 336.

Vaccine therapeutics. A. W. LESCOHIER. Natl. Eclect. M. Ass. Quart., 1918, x, 144.

History of bacterial vaccines. J. L. PAYNE. Natl. Eclect. M. Ass. Quart., 1918, x, 142.

Blood

Acceleration of phagocytosis in citrated blood and citrated blood plasma. M. OTANI. Kitasato Arch. med. Tokyo, 1918, ii, 147.

Effects of intravenous injections of artificial sera in hæmorrhagic animals. C. RICHET, P. BRODIN, and F. SAINT-GIRONS. Presse méd., Par., 1918, xxvi, 581. [326]

Modern therapeutic aspects of diseases of the hæmatopoietic system. F. J. ROHNER. J. Iowa St. M. Soc., 1918, viii, 426.

The pathology and diagnosis of diseases of the hæmatopoietic system. W. E. SANDERS. J. Iowa St. M. Soc., 1918, viii, 423.

Aplastic anæmia. J. P. SCHNEIDER. Am. J. M. Sc., 1918, clvi, 799.

Myelogenous leukæmia. G. W. HARTMAN. Hahneman. Month., 1918, liii, 726.

Thrombosis in Spanish influenza. O. ORTH. Deutsche med. Wchnschr., 1918, xliv, 1298.

Transfusion of blood. RHEAUME. Union méd. du Canada, 1919, xlviii, 65.

New methods for blood transfusion and serum therapy. F. W. HARTMAN. J. Am. M. Ass., 1918, lxxi, 1658. [327]

Blood transfusion and the application of recent methods in obstetrical hæmorrhage. A. C. GUILLAUME. Arch. mens. d'obst. et de gynéc., Par., 1918, vii, 217.

Symposium on blood transfusion. P. GOVAERTS, J. M. T. FINNEY, and T. TUFFIER. Arch. de méd. et pharm. mil., Par., 1918, lxx, 130, 145, 158. [327]

Blood transfusion after gunshot wound. A. FONES. Cor.-Bl. f. schweiz. Aerzte, 1918, lvii, 1719.

Blood and Lymph Vessels

Catheterization of arteries and veins. J. GOYANES. Siglo méd., Madrid, 1918, lxv, 893. [329]

Intra-arterial disinfection. J. J. STUTZIN. Deutsche med. Wchnschr., 1918, xliv, 1196.

Traumatic arteriovenous aneurism of the deep femoral vessels. CHARBONNEL. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1706.

Study of the transformation of arteriovenous aneurisms. L. CHEVRIER. Presse méd., Par., 1918, xxvi, 645.

Popliteal arteriovenous aneurism; radical surgical treatment. M. GUISEPPE. Riforma med., Napoli, 1918, xxxiv, 631. [329]

Ligation of the internal jugular. C. L. C. ATKINSON. Internat. J. Surg., 1918, xxxi, 409.

Traumatic obliteration of arteries. J. BABINSKI and J. HEITZ. Arch. d. mal. du cœur, Par., 1918, xi, 481.

Phlebitis and septicæmia. DEHELLY. Presse méd., Par., 1919, xxvii, 5.

Syphilitic phlebitis. C. R. JIMENEZ. Bol. Asoc. méd. de Puerto-Rico, 1918, xii, 298.

A case of ligation of the inferior vena cava. T. B. NOBLE. Am. J. Obst., N. Y., 1918, lxxviii, 851.

Circular suture of the sectioned axilla and humerus. L. SENCERT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1760.

Ulcerations due to blood-vessel disturbances. SICILIA. Med. Ibera, Madrid, 1918, v, 325.

Poisons

Researches on pus; pyoculture and tryptic reaction. B. QUARELLA and G. VENTURELLI. Gior. d. r. Accad. di med., Torino, 1918, lxxxi, 64. [329]

Treatment of tetanus. R. DE B. D'ORMOND. Rev. gén. de clin. et de thérap., 1918, xxxii, 791.

Researches on gas gangrene of war. KARO. Deutsche med. Wchnschr., 1918, xliv, 1373.

Etiology of the gaseous and non-gaseous gangrenous infections of war wounds. L. FIORAVANTI. Policlin., Roma, 1918, xxv, sez. chir., 313. [330]

Treatment of gaseous gangrene. J. GUYOT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1835.

Toxicology of gas gangrene toxins. W. STRAUB. Deutsche med. Wchnschr., 1918, xliv, 1376.

War gas phlegmons. P. F. NIGST. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 508.

Franco-American conference on tuberculosis. L. FARRAND. Bull. méd., Par., 1918, xxxii, 519.

Conservative treatment of surgical tuberculosis. R. HERTZ. Ugesk. f. Læger, Copenhagen, 1918, lxxx, 1067.

Chemical poisons in warfare. W. C. ALLEN. N. Y. M. J., 1918, cviii, 989.

Experimental research on the excretion of poisons. N. OKUBO. Am. J. Dis. Child., 1918, xvi, 376.

Cocaine poisoning; report of a case with necropsy. E. KELLERT. J. Lab. & Clin. Med., 1918, iv, 129.

A case of anthrax. W. T. DODGE. J. Mich. St. M. Soc., 1918, xvii, 482.

Studies in bovine mastitis; the sources of infection in streptococcic mastitis. F. S. JONES. J. Exp. Med., 1918, xxviii, 735.

Studies in bovine mastitis; infection of the udder with micrococci and other micro-organisms. F. S. JONES. J. Exp. Med., 1918, xxviii, 721.

Syphilis in surgery. J. DE MENDONCA. Brazil-med., 1918, xxxii, 361.

Surgical Diagnosis, Pathology, and Therapeutics

Surgical diagnosis. W. F. FOWLER. Med. Press, 1918, cvi, 470. [330]

Heliotherapy in surgical diseases. C. G. CUMSTON. N. Y. M. J., 1918, cviii, 1120.

Results in removal of foreign bodies by the orthodiagraph method of Mortiz. BAUMEISTER. Deutsche med. Wchnschr., 1918, xliv, 1330.

Operating to the clock. J. O'CONOR. Brit. M. J., 1918, ii, 685.

Experimental Surgery and Surgical Anatomy

Unexpected advantage from an unsuccessful plastic operation. J. F. ESSER. Deutsche med. Wchnschr., 1918, xliv, 1220.

An analysis of the behavior of organs after transplantation in the rat; and of the power of resistance of the constituents of the various organs. L. LOEB. J. Med. Research, 1918, xxxix, 189. [331]

Surgical repair of certain tissues by grafts of dead tissue. J. NAGEOTTE and L. SENCERT. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1546. [332]

The effect of thymus gland injection on the growth and behavior of the guinea-pig. D. M. OLKON. Arch. Int. Med., 1918, xxii, 815.

Radiology

Comparative value of radium and roentgen radiation. R. H. BOGGS. Am. J. M. Sc., 1918, clvi, 690. [333]

The protection of the radiologist, surgeon, and assistants in the course of radiologic operations. L. DELHERM. Presse méd., Par., 1918, xxvi, 667.

Salmond's method for radiography of the superior extremity of the femur. GUILLOT. J. de radiol., Par., 1918, iii, 124.

Remarks on the functioning of the radiologic service in periods of great war activity. HIRTZ. J. de radiol., Par., 1918, iii, 122.

The precision of radiographic images. A. LUMIÈRE. J. de radiol., Par., 1918, iii, 97.

A suggestion regarding a new X-ray unit in radiotherapy. S. Russ. Arch. Radiol. & Electrotherap., 1918, xxiii, 226.

Fundamental considerations upon roentgenotherapy. B. N. Canovas. Siglo méd., Madrid, 1918, lxv, 973.

Roentgen treatment of sarcoma. T. Eiken. Hosp.-Tid., Copenhagen, 1918, lxi, 1553.

Hospital, Medicolegal, and Medical Education

Surgery of industrial wounds and accidents. P. Desfosses. Presse méd., Par., 1918, xxvi, Sup. 803.

Back injuries and their relation to the Workmen's Compensation Law. J. C. Scal. N. Y. M. J., 1918, cviii, 983.

Physicians and the legislature. F. E. Schortemeier. J. Indiana St. M. Ass., 1918, xi, 436.

The future of railway medicine and surgery. W. E. Vest. South. M. J., 1918, xi, 796.

The blight of theory on the acquisition of anatomical knowledge by the ancient Egyptians. J. Wright. N. Y. M. J., 1918, cviii, 973.

Can the small hospital maintain a training school? G. H. Riley. J.-Lancet, 1918, xxxviii, 685.

Medical schools and medical methods. E. G. Jones. Ellingwood's Therap., 1918, xii, 434.

The training of pupil nurses from affiliated schools. L. M. Powell. J.-Lancet, 1918, xxxviii, 686.

What a nurse should know about the mechanical equipment of a hospital. E. F. Stevens. Trained Nurse & Hosp. Rev., 1918, lxi, 329.

Cursory view of medicine and surgery of the twentieth century, viewed from several angles. B. C. Keister. Med. Rec., 1918, xciv, 1068.

The training of the student of medicine. H. Littlejohn, J. W. Crerar, and others. Edinb. M. J., 1918, xxi, 346, 350, 361, 366.

The first steps in the laboratory study of patients. W. R. Logan. Edinb. M. J., 1918, xxi, 334.

Preventive medicine and the reconstruction of the race. F. Peterson. N. Y. M. J., 1918, cviii, 1105.

The danger and injustice of special legislation for medical sects. W. B. Russ. Texas St. J. Med., 1918, xiv, 273.

Frederick Tyrrell; biography. F. A. C. Tyrrell. Brit. J. Ophth., 1918, ii, 593.

John Herr Musser; biography. H. A. Kelly. Boston M. & S. J., 1918, clxxix, 772.

Short biography of John Bard, 1716 to 1799. G. K. Dickinson. Am. J. Obst., N. Y., 1918, lxxviii, 796.

John Bard; biography. W. L. Burrage. Boston M. & S. J., 1918, clxxix, 739.

Giles Firmin; biography. W. L. Burrage. Boston M. & S. J., 1918, clxxix, 799.

MILITARY SURGERY

Immobilization of thigh fractures on the battle field. L. Babin. Presse méd., Par., 1918, xxvi, 669.

Simulation of urinary diseases by soldiers. J. Janet. Presse méd., Par., 1918, xxvi, 671.

Massage and electrotherapeutic work at a war hospital. N. Morris. Practitioner, Lond., 1918, ci, 324.

A fortnight in a field hospital. A. M. Campbell. J. Mich. St. M. Soc., 1918, xvii, 457.

Experiences of a Red Cross surgeon. W. F. Campbell. Med. Times, 1918, xlvi, 303.

The early history of the Army Medical Service and the Naval Medical Service. A. Chaplin. Brit. M. J., 1918, ii, 675.

Medical notes from the front. C. G. Cumston. N. Y. M. J., 1918, cviii, 992.

Fifth Interallied Surgical Conference, November, 1918. Presse méd., Par., 1918, xxvi, 643.

The classification adopted for the material constituting the collections in the army medical museum of the Surgeon General's office at Washington. R. W. Shufeldt. Med. Rev. Revs., 1918, xxiv, 727.

The war and afterward. P. Butler. Minnesota Med., 1918, i, 463.

The application of war surgery to civil practice; report of clinical lecture. F. J. Steward. Guy's Hosp. Gaz., 1918, xxxii, 396.

GYNECOLOGY

Uterus

Carcinoma of the cervix. J. C. Strawn. Clinique, Chicago, 1918, xxxix, 505.

The radical treatment of cancer of the cervix by igni-extirpation. E. A. Weiss. Am. J. Obst., N. Y., 1918, lxxviii, 776.

Technique of radium therapy of uterine cancer. M. Becerro de Bengoa. An. de la Fac. de med., Montevideo, 1918, ii, 886.

Occurrence of case of uterine cancer without bleeding. N. J. Boerma. Nederl. Tijdschr. v. Geneesk., 1918, ii, 1534.

Necessity for surgical treatment of uterine cancer. I. N. Corpas. Repert. de med. y cirug., Bogotá, 1918, x, 60.

The malignity of uterine neoplasms and sarcoma of this organ. M. Bonaponte. Arch. de ginec., obst. y pediat., Barcelona, 1918, xxxl, 293.

Sterility due to retrodisplacement of the uterus; non-operative and operative treatment. E. L. Dorsett. J. Missouri St. M. Ass., 1918, xv, 350. [334]

A case of menorrhagia treated with X-ray. W. P. Healey. Am. J. Obst., N. Y., 1918, lxxviii, 916.

Uterus bicornis. Hoehne. Deutsche med. Wchnschr., 1918, xliv, 1373.

A new operation for uterus bicornate. A. N. McArthur. Med. J. Australia, 1918, ii, 510.

The dangers of uterine curettage. A. W. Lincoln. Ann. Surg., Phila., 1918, lxviii, 638.

A case of uterine perforation with passage of a foreign body into the pelvic cavity. S. C. Ahumada. Rev. argent. de obst. y ginec., 1918, ii, 373.

Shortening of the uterine ligaments in retroversion of the gravid uterus; fifth successful case. W. T. Chenhall. Med. J. Australia, 1918, ii, 451.

Implantation of the newly fertilized ovum in the uterus. J. Oliver. Brit. M. J., 1918, ii, 655.

The uterus throughout the ages from Herophilus to the present day. F. La Torre. Arch. mens. d'obst. et gynéc., Par., 1918, v, 238.

Adnexal and Periuterine Conditions

Sarcoma of the left ovary in a child twenty-three months old. H. E. Hayd. Am. J. Obst., N. Y., 1918, lxxviii, 764.

Report of cases of painful ovaries overlooked at time of operation. H. Grad. Am. J. Obst., N. Y., 1918, lxxviii, 921.

Hernia of ovary and tube. C. H. Cuff. Brit. M. J., 1918, ii, 629.

The relation of the supplying ovary to the causation of sex. J. G. Murray. Bull. Johns Hopkins Hosp., 1918, xxix, 275.

Ovarian transplantation. Schickele. Deutsche med. Wchnschr., 1918, xliv, 1263.

The present medical and surgical treatment of adnexal inflammations. R. P. Escalier. Rev. argent. de obst. y ginec., 1918, ii, 377.

Salpingitis. H. H. Helbing. Nat. Eclect. M. Ass. Quart., 1918, x, 105.

Pathogenesis and pathology of phelgmons of the broad ligaments. C. A. Castano. Rev. Univ. de Buenos Aires, 1918, xv, 219. [334]

Pus tubes. H. E. Hayd. Am. J. Obst., N. Y., 1918, lxxviii, 868.

Perineorrhaphy; a simple and efficient operation. T. J. Watkins. Surg. Clin. Chicago, 1918, ii, 1137.

External Genitalia

Vaginal varicoses. G. L. Wayne. Ellingwood's Therap., 1918, xii, 439.

A case of vaginal atresia. J. Adeodato. Brazil-med., 1918, xxxii, 365.

A case of congenital gynatresia. J. E. Pallares. Siglo méd., Madrid, 1918, lxv, 1054. [335]

Prevention of perineal lacerations and their immediate repair. R. A. Wright. Clinique, Chicago, 1918, xxxix, 521.

Miscellaneous

Technique of female pelvic peritonization. Beuttner. Monograph, Zurich, 1918.

Pelvic pain due to uterine displacements. DeW. G. Wilcox. N. Eng. M. Gaz., 1918, liii, 554.

Individual enucleation of multiple pelvic tumors versus their mass removal. H. Crouse. Am. J. Surg., 1918, xxxii, 297.

Pathologic conditions of the pelvic viscera, the result of induced abortions causing sterilization, disclosed by abdominal section. F. Reder. Am. J. Obst., N. Y., 1918, lxxviii, 823.

A clinical lecture on gonorrhœa in women. W. E. Fothergill. Brit. M. J., 1918, ii, 707.

Treatment of some common female ailments. F. J. McCann. Brit. M. J., 1918, ii, 705.

The ureteral danger in gynecological surgery. Stajano Med. Ibera, Madrid, 1918, v, 199.

OBSTETRICS

Pregnancy and Its Complications

Errors in the early diagnosis of normal pregnancy. A. Turenne. Rev. argent. de obst. y ginec., 1918, ii, 365.

Date of impregnation in the woman. L. Razetti. Gac. méd. de Carácas, 1918, xxv, 232.

Abdominal pregnancy. J. O. Polak. Am. J. Obst., N. Y., 1918, lxxviii, 927.

A case of abdominal pregnancy at term. T. B. Noble. Am. J. Obst., N. Y., 1918, lxxviii, 767.

An interesting case of abdominal fœtation. G. V. James. Madras M. J., 1918, i, 339.

Diagnosis of ectopic pregnancy. O. C. Welbourn. Nat. Eclect. M. Ass. Quart., 1918, x, 121.

A case of ectopic gestation with unusual features. A. M. Judd. Am. J. Obst., N. Y., 1918, lxxviii, 914.

Rupture of tubal pregnancy with peritoneal flooding. A Quintella. Brazil-med., 1918, xxxii, 357.

The extraperitoneal route in obstetrics. Nubiola. Therapia, Barcelona, 1918, x, 642.

Eclampsia and urinary albuminuria. Vital Aza. Prog. de los clin., Madrid, 1918, vi, 342.

Toxæmia of pregnancy with ocular symptoms. Platero. Med. Ibera, Madrid, 1918, v, 197.

A study of various cases of pregnancy toxæmia. G. C. Mosher. Am. J. Obst., N. Y., 1918, lxxviii, 803. [336]

Indications for cæsarean section, with a record of personal experiences in a series of 109 cases. A. J. Rongy. Am. J. Obst., N. Y., 1918, lxxviii, 840. [336]

Two cases of cæsarean section with attenuated lower uterine segment. F. A. Dorman. Am. J. Obst., N. Y., 1918, lxxviii, 912.

Cæsarean section under local anæsthesia. W. M. Brown. Am. J. Obst., N. Y., 1918, lxxviii, 836.

Hæmorrhage of pregnancy, placenta prævia, and cæsarean section. A. Boquel. Arch. mens. d'obst. et de gynéc., Par., 1918, vii, 190.

Fatal abortion by oleum sabinæ. A. Welcker. Nederl. Tijdschr. v. Geneesk., 1918, ii, 1307.

Spirilla associated with disease of the fœtal membranes in cattle. T. Smith. J. Exp. Med., 1918, xxviii, 701.

Improper treatment of abortion. J. E. Davis. J. Mich. St. M. Soc., 1918, xvii, 478.

Some remarks on the relationship of syphilis to abortion, miscarriage, and fœtal abnormalities. F. L. Adair. Am. J. Obst., N. Y., 1918, lxxviii, 678. [336]

Spontaneous rupture of the uterus, possibly interstitial; five months pregnant. F. L. Oastler. Am. J. Obst., N. Y., 1918, lxxviii, 925.

The limits of mixed or Braxton-Hicks version in the treatment of placenta prævia. D. F. Villanueva. Arch. de ginec., obst. y pediat., Barcelona, 1918, xxvi, 263.

Nephritis and nephroses; nephropathia gravidarum. M. Lohlein. Deutsche med. Wchnschr., 1918, xliv, 1187.

The heart of a pregnant woman. L. Burckhardt. Am. J. Obst., N. Y., 1918, lxxviii, 785.

Renal complications of pregnancy from the standpoint of the urologist. H. G. Bugbee. J. Am. M. Ass., 1918, lxxi, 1538. [337]

Labor and Its Complications

Indications and contra-indications of symphyseotomy and pubiotomy. D. Iraeta. Rev. Argent. de obst. y ginec., 1918, ii, 383.

Version in midwifery. M. Culpin. Med. J. Australia, 1918, ii, 529.

Podalic version. P. W. Van Peyma. Buffalo M. J., 1918, lxxiv, 183.

The Irving W. Potter method of practicing version. E. G. ZINKE. Am. J. Obst., N. Y., 1918, lxxviii, 829.

Forceps rotation of the head in persistent occipito-posterior positions. A. H. BILL. Am. J. Obst., N. Y., 1918, lxxviii, 791. [338]

Stillbirth due to infection. E. L. CORNELL. Illinois M. J., 1918, xxxiv, 266. [338]

Another unique case of stillbirth. E. H. LINDSAY. Med. J. Australia, 1918, ii, 512.

Fœtal spontaneous evolution. A. HERRGOTT. Ann. de gynec. et d'obst., Par., 1918, lxxxii, 193.

Is twilight sleep safe in labor? A. CALMANN. Deutsche med. Wchnschr., 1918, xliv, 1305.

Use of pituitrin in uterine inertia and postpartum hæmorrhage. J. E. HOLMAN. Nat. Eclect. M. Ass. Quart., 1918, x, 163.

Three cases of first labor in women with congenital dislocation of one hip. M. G. HASKINS. Buffalo M. J., 1918, lxxiv, 189.

Pregnancy and labor in epileptic women. M. MUNOZ. Rev. de med. y cirug. práct., Madrid, 1918, cxxl, 308.

Complete uterine rupture; peritonitis; suture and drainage; recovery. R. GANDOLFO and A. ACAMPO. Rev. argent. de obst. y ginec., Buenos Aires, 1918, ii, 408. [338]

Puerperium and Its Complications

Treatment of puerperal infection. I. A. GABASTOU. Rev. argent. de obst. y ginec., 1918, ii, 410.

A case of puerperal infection treated by anti-streptococci serum. A. V. MARCONDES. Ann. Paulist. de med. e cirurg., 1918, ix, 167.

Bacteriology of the blood in puerperal infection. POTOCKI. Ann. de gynéc. et d'obst., Par., 1918, lxxii, 217. [339]

Postpartum shock. S. E. BERMANN. Rev. argent. de obst. y ginec., Buenos Aires, 1918, ii, 417.

Infection by the bacillus coli communis complicating pregnancy, labor, and the puerperal state. E. P. DAVIS. South. M. J., 1918, xi, 793.

A case of urinary incontinence subsequent to labor. IZQUIERDO. Rev. de med. y cirug. práct., Madrid, 1918, cxxl, 308.

Retained placenta on inverted uterus. A. D. O'GUNJOBI-LABOR. Ellingwood's Therap., 1918, xii, 438.

Miscellaneous

Fatal hæmorrhage from umbilical cord. G. JORGENSEN. Ugesk. f. Læger, Copenhagen, 1918, lxxx, 1929.

Anatomic and physiologic study of the spinal curve in the newborn. G. GEFFRAY. Arch. mens. d'obst. et de gynéc., Par., 1918, vii, 200.

Melæna neonatorum. J. E. G. WADDINGTON. Nat. Eclect. M. Ass. Quart., 1918, x, 149.

Maternity supervision; Ohio's contribution. W. A. HUMPHREY. J. Am. Inst. Homœop., 1918, xi, 643.

Problems in obstetrics. I. JOSEPHSON. N. Y. M. J., 1918, cviii, 981.

Obstetrical practice; some commonplace aspects. H. C. VAN B. PECKHAM. J. Am. Inst. Homœop., 1918, xi, 639.

Maternal impressions and feeblemindedness. W. S. WALSH. Med. Rec., 1918, xciv, 1113.

"Lying-in" in the olden literature. M. BONTAREL. Arch. mens. d'obst. et gynéc., Par., 1918, v, 212.

The essential features of a successful maternity and child welfare scheme for the smaller towns. R. H. DEANS. Practitioner, Lond., 1918, ci, 341.

Obstetric science and art in the service of the nation. E. P. DAVIS. J. Am. M. Ass., 1918, lxxi, 1869.

GENITO-URINARY SURGERY

Kidney, and Ureter

Diagnosis of urinary calculus. H. G. WOUTAT. J.-Lancet, 1918, xxxviii, 703.

Some points in the management of urinary calculi. J. D. BARNEY. Internat. J. Surg., 1918, xxxi, 389. [340]

Contusion; suppuration of the right kidney; recovery with normal functioning. BERGERET. Bull. et mém. Soc. de chir. de Par., 1918, xliv, 1703.

Case of hydronephrosis by obstruction of the left ureter; use of X-ray in diagnosis. J. AVILES. Bol. Asoc. méd. de Puerto-Rico, 1918, xii, 286.

Absorption from the renal pelvis in hydronephrosis due to permanent and complete occlusion of the ureter. J. E. BURNS and E. O. SWARTZ. J. Urol., 1918, ii, 445.

Hydronephrosis and pyonephrosis. J. F. MALTMAN. Clinique, Chicago, 1918, xxxix, 509.

A case of fœtal polycystic kidney and its probable pathogenesis. F. A. DELUCA. Semana méd., Buenos Aires, 1918, xxv, 470.

Acute and subacute unilateral infectious nephritis without pyuria from the affected side. R. V. DAY. Calif. St. J. Med., 1918, xvi, 528.

Uræmic hiccough and prostatectomy. LOUMEAU. Gaz. hebd. d. sc. méd., Bordeaux, 1918, xxxix, 181.

Atypical embryonic formations of the kidneys; acute submiliary carcinosis of the lung with generalized empyema and pneumothorax. R. LUTEMBACHER. Ann. de méd., Par., 1918, v, 435.

Treatment of colon bacillus infections of the kidney and bladder by surgical measures applied to the ascending colon. G. MAC GOWAN. J. Am. M. Ass., 1918, lxxi, 1897. [340]

The effect on the kidney of ureterovesical anastomosis; experimental and clinical report. A. PETERSON. J. Am. M. Ass., 1918, lxxi, 1885. [341]

Renal meningococcic findings. J. SABRAZES. Gaz. hebd. d. sc. méd., Bordeaux, 1918, xxxix, 178.

Severe nephrorrhagia after nephrotomy for metastatic renal abscess. P. TASCA. Riforma med., Napoli, 1918, xxxiv, 790.

Notes on indications in kidney surgery. G. KOLISCHER. Illinois M. J., 1918, xxxiv, 327.

Immediate results of nephrectomy for tuberculosis. CIFUENTES. Med. Ibera, Madrid, 1918, v, 275.

The postoperative care of the nephrectomized. LEGUEU. Rev. gén. de clin. et de thérap., Par., 1918, xxxii, 790.

Renal function as measured by the elimination of fluids, salt and nitrogen, and the specific gravity of the urine. H. O. MOSENTHAL. J. Exp. Med., 1918, xxii, 770.

Certain aspects of the clinical value of the estimation of kidney function. E. H. MASON. Am. J. M. Sc., 1918, clvi, 830.

Ureteral stone; subsequent history. C. M. MC KENNA. Surg. Clin. N. Am., 1918, ii, 1239.

Stenosis of the ureter caused by appendicitis. G. NYSTROM. Nord. med. Ark., Stockholm, 1918, li, Kirurgi, 109. [342]

Acquired stricture of the lower end of the ureter. R. H. HERBST. J. Am. M. Ass., 1918, lxxi, 1722. [342]

Renal and ureteral infection with the gonococcus. L. BUERGER. N. Y. M. J., 1918, cviii, 1022.

Bladder, Urethra and Penis

Very large colloid carcinoma of the bladder. B. S. BARRINGER. Internat. J. Surg., 1918, xxxi, 402. [342]

Unusual foreign body in the bladder. VILLETTE and TANCHE. Progrès méd., Par., 1918, p. 437.

Stone in the bladder complicated by a colon bacillus infection. C. M. MC KENNA. Surg. Clin. Chicago, 1918, ii, 1242.

Vesical calculi in childhood. ARQUELLADA. Med. Ibera, 1918, v, 197. [342]

Cystitis. W. LENEHAN. J. Mich. St. M. Soc., 1918, xvii, 475.

Repair of an ureteral defect by a plastic operation on the bladder wall. G. NYSTROM. Nord. med. Ark., Stockholm, 1918, li, Kirurgi, 142. [343]

A new operation for opening the bladder. B. VON MEZO. Deutsche med. Wchnschr., 1918, xliv, 1164.

Urethral diverticular calculi in women. A. V. D. CARVALHO. Ann. Paulist de med. e cirurgia, 1918, ix, 208.

Diverticula of the female urethra. J. C. NEEL. Calif. St. J. Med., 1918, xvi, 494. [343]

Hypogastric deviation of the urine in the treatment of urethral wounds. R. MOSTI. Policlin., Roma, 1918, xxv, sez. chir., 374. [344]

Diagnosis and treatment of urethral strictures. S. PASCUAL. Prog. de los clin., Madrid, 1918, vi, 322.

Urethral stricture, acute cystitis, and urinary retention. LOUMEAU. Gaz. hebd. d. sc. méd., Bordeaux, 1918, xxxix, 188.

The use of a provocative vaccine in determining the cure of gonorrhœal urethritis. G. H. PEARSON. J. Urol., 1918, ii, 455.

Rupture of the urethra. A. D. BEVAN. Surg. Clin. Chicago, 1918, ii, 1131.

Three cases of urethral repair for war wounds. GAYET. Lyon méd., 1918, cxxvii, 559.

A case of complete hypospadias; free transplant of vena saphena magna as an urethral substitute. C. ADLERCREUTZ. Nord. med. Ark., Stockholm, 1918, li, Kirurgi, 163.

Genital Organs

Undescended testes. A. D. BEVAN. Surg. Clin. Chicago, 1918, ii, 1101.

Sarcoma of the testicle. J. J. GILL. Illinois M. J., 1918, xxxiv, 326.

Transverse ectopy of the testis with masculine uterus. T. KIMURA. Ann. Surg., Phila., 1918, lxviii, 420. [344]

Varicocele operation. C. M. MCKENNA. Surg. Clin. Chicago, 1918, ii, 1241.

The human seminal vesicles at birth. E. M. WATSON. Ann. Surg., Phila., 1918, lxviii, 416. [345]

Seminal vesiculotomy in the treatment of gonorrhœal rheumatism. J. R. DILLON. Calif. St. J. Med., 1918, xvi, 485. [345]

Prostatic obstruction. A. D. BEVAN. Surg. Clin. Chicago, 1918, ii, 1123.

Observations on hypertrophy of the prostate gland. L. SEXTON. Med. Rec., 1918, xciv, 1027.

The clinical aspect of prostatic hypertrophy. E. Z. WANOUS. Minnesota Med., 1918, i, 460.

Prostatectomy. F. STEWART. Illinois M. J., 1918, xxxiv, 263. [346]

Surgical pathology of the human prostate gland. O. S. LOWSLEY. Ann. Surg., Phila., 1918, lxviii, 390. [346]

The silent prostate. J. A. GARDNER. J. Am. M. Ass., 1918, lxxi, 1636. [346]

Treatment of male genital tuberculosis. E. AIEVOLI. Riforma med., Napoli, 1918, xxxiv, 794.

The treatment of genital tuberculosis in the male. W. C. QUINBY. J. Am. M. Ass., 1918, lxxi, 1790. [347]

Miscellaneous

Chart for recording cystoscopic examinations. F. HINMAN. J. Urol., 1918, ii, 433.

The diagnostic and prognostic value of blood urea in urology. A. E. GOLDSTEIN. J. Am. M. Ass., 1918, lxxi, 1957.

Pathologic anatomy of genital and localized sporotrichosis. A. FORNERO. Ann. di ostet. e ginec., Milano, 1918, xli, 263.

Extravasation of urine. W. E. KEANE. J. Mich. St. M. Soc., 1918, xvii, 429. [347]

Genito-urinary tuberculosis in children. KIRMISSON Rev. gén. de clin. et de thérap., Par., 1918, xxxii, 641. [348]

Consideration of the methods for demonstrating tubercle bacilli in the urine. E. M. WATSON. Am. J. M. Sc., 1918, clvi, 636. [348]

Hæmaturia and purpura. H. L. KRETSCHMER. Surg. Clin. Chicago, 1918, ii, 1185.

Non-nephritic albuminurias. I. ROMANELLI. Policlin., Roma, 1918, xxv, sez. med., 362.

SURGERY OF THE EYE AND EAR

Eye

Perforating injury of both eyes. J. L. GIBSON. Med. J. Australia, 1918, ii, 492.

Report of two orbital tumors. A. E. DAVIS. Am. J. Ophth., 1918, i, 828. [350]

Permanent vascular changes following injuries to the eye. E. JACKSON. Am. J. Ophth., 1918, iii, 776. [350]

The conservative treatment of ocular injuries. J. H. HESTER. Am. J. Surg., 1918, xxxii, 304.

Ocular malingering. E. M. ALGER. N. Y. St. J. Med., 1918, xviii, 487.

Disturbances of visual orientation. G. A. BERRY. Brit. J. Ophth., 1918, ii, 597.

Variations in the clinical picture of interstitial keratitis. A. BRAV. N. Y. M. J., 1918, cviii, 1078.

Syphilis as it pertains to the eye. A. E. BULSON, JR J. Indiana St. M. Ass., 1918, xi, 438.

Alterations in the visual fields associated with pellagra. F. P. CALHOUN. Am. J. Ophth., 1918, i, 834.

Strabismus convergence; its early recognition and treatment in young children. P. H. DERNEHL. Wisconsin M. J., 1918, xvii, 271.

Focal infections of the eye from the intestinal tract. J. G. DWYER. J. Am. M. Ass., 1918, lxxi, 2046.

Glaucoma congenitalis; a successful surgical outcome. D. HALLETT and M. B. BEALS. J. Am. Inst. Homœop., 1918, xi, 656.

Postciliary scleral trephining for acute glaucoma. A. E. Ewing. J. Am. M. Ass., 1918, lxxi, 1967. [350]

Ophthalmoscopic conditions simulating sarcoma of the choroid. H. Friedenwald. Am. J. Ophth., 1918, i, 822.

Ring infiltration of the cornea in a case of purpura, with a discussion of its pathogenesis and some general observations on the different forms of corneal infiltration. D. V. Giri. Brit. J. Ophth., 1918, ii, 611.

Successful extraction of an opaque and dislocated crystalline lens. H. F. Hansell. N. Y. M. J., 1918, cviii, 1120. [351]

Congenital defect of tarsus combined with hypoplasia of meibomian glands. K. Hiwatari. Am. J. Ophth., 1918, i, 849.

Discussion of the ocular manifestation of systemic and local disease. B. M. Howley. J. M. Soc. N. J., 1918, xv, 416.

Pollakiuria as a functional disturbance due to eye strain; causes of excessive frequency of micturition. W. W. Kahn. J. Am. M. Ass., 1918, lxxi, 1877.

Clinical and bacteriologic study of infective corneal tumors. Leoz y Ortin. Rev. Ibero-Am. de cien. méd., Madrid, 1918, xl, 431.

The effect of faulty skeletal alignment upon the eyes. C. L. Lowman. Am. J. Orthop. Surg., 1918, xvi, 459.

Peculiar anomaly of fundus oculi. S. H. McKee. Am. J. Ophth., 1918, i, 848.

Trachoma. J. H. Oakley. J.-Lancet, 1918, xxxviii, 675.

The requisite attributes of properly fitted spectacles and eye-glasses. S. L. Olsho. Penn. M. J., 1918, xxii, 140.

Injuries to eyes of railway operatives; their prevention and treatment. G. H. Price. South. M. J., 1918, xi, 799.

Cellulitis of the upper lid due to a foreign body in the eye; report of a case. A. Rovinsky. N. Y. M. J., 1918, cviii, 1032.

Clinical results following prophylactic treatment with silver nitrate for blenorrhœa neonatorum. A. B. Spalding. Calif. St. J. Med., 1918, xvi, 526.

Operation for senile cataract. F. Allport. N. Y. M. J., 1918, cviii, 841. [351]

Tumor of the orbit with extensions, result of treatment by X-rays. W. M. Sweet. Am. J. Ophth., 1918, i, 830.

Practical point in technique of corneal tattooing. S. Theobald. Am. J. Ophth., 1918, i, 847.

Herpes zoster affecting the ciliary nerves. G. W. Thompson. Brit. J. Ophth., 1918, ii, 624.

Transient left homonymous hemianopsia. H. H. Tyson. Am. J. Ophth., 1918, i, 831.

Ocular affections in wounds of the cranium. E. Velter. Survey Head Surg., 1918, i, 202.

Siderosis bulbi. F. H. Verhoeff. Brit. J. Ophth., 1918, ii, 571.

The necessity of a cycloplegic in refracting myopes. H. A. Watts. J. Am. Inst. Homœop., 1918, xi, 655.

Tuberculin in diseases of the eye. J. E. Weeks. Am. J. Ophth., 1918, i, 753.

The rational etiology and satisfactory treatment of dacryocystitis. W. R. Thompson. J. Am. M. Ass., 1918, lxxi, 1727. [351]

Congenital fistula of the lachrymal sac. W. B. Weidler. N. Y. M. J., 1918, cviii, 944.

The eye in relation to general disease. D. E. Welsh. J. Mich. St. M. Soc., 1918, xvii, 480.

Paralytic strabismus cured by simple operative procedure. J. S. Wyler. Am. J. Ophth., 1918, i, 783.

Hysterical disorders of vision. L. R. Yealland. Brit. J. Ophth., 1918, ii, 545.

The etiology of hereditary optic nerve atrophy; report of two cases with interesting X-ray findings. W. Zentmayer. Arch. Ophth., 1918, xlvii, 627.

Report of the government ophthalmic hospital, Madras. H. Kirkpatrick. Indian M. Gaz., 1918, liii, 452.

Jottings on local anæsthesia in ophthalmic surgery. S. J. Taylor. Brit. J. Ophth., 1918, ii, 607.

Modern antisepsis in ocular surgical procedures. R. Guiral. Rev. de med. y cirug. de la Habana, 1918, vol. xxiii.

Local anæsthesia in orbito-ocular surgery. Duverger. Survey Head Surg., 1918, i, 200.

Progress of ophthalmology. E. W. Clap. Boston M. & S. J., 1918, clxxix, 763.

Organization and development of the school of ophthalmology. G. E. De Schweinitz. Am. J. Ophth., 1918, i, 817.

Ear

Acute ear cases in general practice. H. W. Champlin. Hahneman Month.,.1918, liii, 679.

Some points of interest in tests of labyrinthine function. C. Graef. Laryngoscope, 1918, xxviii, 811.

Proper diagnosis as a guide to prognosis and operative treatment of impaired hearing. R. Sonnenschein. Illinois M. J., 1918, xxxiv, 324.

Aural cases in wartime. C. A. Dighton. Med. Press, 1918, cvi, 458.

Malingering from the standpoint of the ear. J. A. Robinson. N. Y. St. J. Med., 1918, xviii, 463.

Osteosclerosis of the temporal bone in chronic suppuration. H. B. Graham. Laryngoscope, 1918, xxviii, 872. [352]

Paralysis of the sixth cranial nerve associated with otitis media. J. M. Wheeler. J. Am. M. Ass., 1918, lxxi, 1718.

Acute suppurative otitis media. L. N. Grosvenor. J.-Lancet, 1918, xxxviii, 710.

Otolaryngology in the first year of the war; an informal report. H. P. Mosher. J. Am. M. Ass., 1918, lxxi, 1872.

Some aspects of deafness. A. E. Perkins. Trained Nurse & Hosp. Rev., 1918, lxi, 342.

Diseases of the ear in children. A. Lewy. Clinique, Chicago, 1918, xxxix, 512.

The basis of labyrinthine semeiology. H. Pieron. Med. Press, 1918, cvi, 477.

Notes of an otologist in Austro-Hungarian military hospitals. W. E. von Rodt. Cor.-Bl. f. schweiz. Aerzte, 1918, xlviii, 497.

Brief case reports from the ear, nose and throat clinics of the Western Hospital, Montreal. G. T. Ross. Canad. M. Ass. J., 1918, viii, 1110.

A case report of hæmorrhage in the middle ear. D. E. Welsh. J. Mich. St. M. Soc., 1918, xvii, 482.

Outlines of a new instrument to be used in skin-grafting in the radical mastoid cavity. A. Kahn. Laryngoscope, 1918, xxviii, 875.

The modern mastoid operation. J. J. Kyle. Laryngoscope, 1918, xxviii, 805. [352]

Answer to opponents of the radical mastoid operation. W. C. Bowers. Laryngoscope, 1918, xxviii, 790. [352]

The open and tamponless treatment of wounds in the mastoid operation. A. Brueggemann. Deutsche med. Wchnschr., 1918, xliv, 1161.

Ablation of the labyrinth in a case with Ménière's symptoms. C. Yorke. Brit. M. J., 1918, ii, 420. [352]

A summary of the activities of the section of otolaryngology. H. P. Mosher. Mil. Surgeon, 1918, xliii, 631.

SURGERY OF THE NOSE, THROAT, AND MOUTH

Nose

Asthma from the point of view of the rhinologist. R. G. BROWN. Med. J. Australia, 1918, ii, 463.

Two cases of rhinolithiasis. A. BOSCH UCELAY. Arch. de ginec., obst. y pediat., Barcelona, 1918, xxxi, 279.

Multiple osteoma of the nasal accessory; report of a case complicated by syphilis. W. L. CULBERT. N. Y. St. J. Med., 1918, xviii, 465.

The present status of the operative treatment of chronic frontal sinusitis. T. W. MOORE. J. Am. M. Ass., 1918, lxxi, 1811. [353]

The treatment of intranasal and accessory sinus diseases. O. J. STEIN. Interst. M. J., 1918, xxv, 917.

Rib cartilage for saddle-back nose. P. G. SKILLERN, JR. Ann. Surg., Phila., 1918, lxviii, 580.

Contribution to the study of rhinoplasty. E. J. MOURE. Survey Head Surg., 1918, i, 212.

Throat

Throat fevers in children. H. HAYS. Med. Times, 1918, xlvi, 310.

Treatment of hæmorrhage of the upper respiratory tract. O. KAHLER. Deutsche med. Wchnschr., 1918, xliv, 821.

A case of laryngeal obstruction complicating measles. H. L. BAUM. Colorado Med., 1918, xv, 309.

Phototherapy of laryngeal tuberculosis. N. R. BLEGVAD. Ugesk. f. Læger, Copenhagen, 1918, lxxx, 1910.

Intubation for angioma of the larynx in a child ten weeks old. J. J. LEVBARG. Laryngoscope, 1918, xxviii, 867.

Contusion of the larynx. THOLLON and LABERNADIE. Survey Head Surg., 1918, i, 223.

Experiments with a new and most efficient remedy for pulmonary and laryngeal tuberculosis. F. TWEDDELL. Med. Rec., 1918, xciv, 1061.

Fracture of the hyoid bone. W. W. PEARSON. J. Iowa St. M. Soc., 1918. viii, 395. [353]

A foreign body in the pharynx. Z. SHAFEI. Practitioner, Lond., 1918, ci, 348.

Retropharyngeal abscess. M. P. BOEBINGER. N. Orl. M. & S. J., 1918, lxxi, 249.

Discussion of clinical problems relating to faucial tonsils. G. E. SHAMBAUGH. Surg. Clin. Chicago, 1918, ii, 1145.

Historical account of tonsillectomy. E. E. V. GLOVER. Brit. M. J., 1918, ii, 685.

Mouth

Roentgenographic studies of tissues involved in chronic mouth infections. A. D. BLACK. J. Am. M. Ass., 1918, lxxi, 1279. [353]

Cancer of the oral cavity. L. D. BULKLEY. Dental Cosmos, 1918, lx, 774. [353]

Treatment of wounds involving the mucous membrane of the mouth and nose. P. P. COLE. Survey Head Surg., 1918, i, 231.

Pyorrhœa alveolaris. W. F. DREA. Colorado Med., 1918, xv, 302.

Review of recent advances in dental surgery. F. N. DOUBLEDAY. Practitioner, Lond., 1918, ci, 331.

Two cases illustrating plastic and dental treatment. H. D. GILLIES. Survey Head Surg., 1918, i, 229.

Consideration of some dental anomalies. C. J. LYONS. J. Mich. St. M. Soc., 1918, xvii, 370.

Report of two cases of large dentigerous cysts. G. W. MAC KENZIE. Hahneman. Month., 1918, liii, 734.

Some observations on the treatment of cleft palate. M. M. FEDERSPIEL. Wisconsin M. J., 1918, xvii, 258. [353]